Mankind Throughout the Ages

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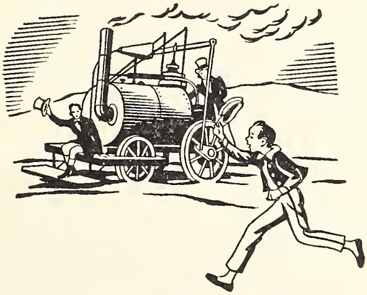

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Mankind Throughout the Ages

By

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Mankind Throughout the Ages

PART I

Introducing the Story of Civilizations

A Very Important New Word

CIVILIZATION. A twelve-letter word, long and hard to pronounce? Perhaps; yet students who tell us about the peoples of the world use it frequently. They say that it is a very important word, that it stands for the most important single idea about tribes and communities and countries. They say that we really cannot understand the world we live in unless we know the word *civilization* and can use it properly.

So, even though it has twelve letters and may sound strange at first, let us study it and learn to understand it. Since this is the story of the great civilizations that man has succeeded in building on the earth, we should ask, first, "What does civilization mean?"

Do not expect to be able to answer this question completely after the study of the first few chapters. You may not be able to answer it at all well until your study of the entire story of man and his changing society is completed; in fact, your study of civilization will never really be finished. Year after year throughout the time you spend in school and college you will be making clearer your understanding of it. Year after year, as you travel from your own community to other regions and countries of the earth, you will know better and better what civilization means. Even when you are very old you will still be growing in your understanding of it. So it would be foolish to think that we can at this beginning point in our studies tell quickly and accurately what is the civilization of any one people. And we shall be equally unable to tell what civilization is in general.

But even though we cannot now tell exactly what we mean by the word *civilization*, if we are to use it at all we must have some idea of what it means. We can begin by studying some examples.

First, in Chapter I let us read a story about some nomads in central Asia and some other peoples to get a glimpse of their ways of living, their houses and furnishings, their food and clothing, their crafts and their arts.

CHAPTER I

Visits to People: Civilized and Uncivilized

1. Spring Moving with the Kirghiz Herdsmen of Asia

On a clear, crisp morning in April we are up before sunrise and ready to travel on our shaggy little horses across the vast plain called the steppe. We are planning to visit our friend Koorman, a Kirghiz herdsman who lives at the foot of the Tien Shan Mountains in south-central Asia (figure 1). A messenger came yesterday, urging us to start today. He explained that the long winter is over and that within a few days Koorman's village of tents will have to be moved to better pasture lands. If we wish to go up into the mountains with Koorman's herds, he said, we must come at once.

As we start, the sun bursts over the horizon. Dawn is just breaking, and the sky is a wall of yellowish red. The steppe, almost as level as the sea, is a mass of waving grass and flowers.

The Land of the Kirghiz Is a Vast Garden in Spring

"Flowers and other plants on this high plateau of south-central Asia?" you ask. Yes, indeed; there are millions of them during the spring and summertime, in the very places which are swept by howling blizzards and covered by a thick blanket of snow during the seven months of winter. For the Kirghiz, like the Tibetan, lives on the roof of the world in a climate of seasonal changes. There is the long, freezing winter when he shuts himself and his animals up in tents. Then follow a beautiful but very short spring, a warm and stimulating summer, and a very short autumn. It is in the spring that the Kirghiz garden blooms. There are fruit trees — apple, apricot, and plum. There are asparagus, onions, and rhubarb. Among the flowers are the chrysanthemum, crocus, heliotrope, peony and tulip, blue and purple columbine, pansy, purple and yellow lady's-delight, red, yellow, and white roses, and the poppy.

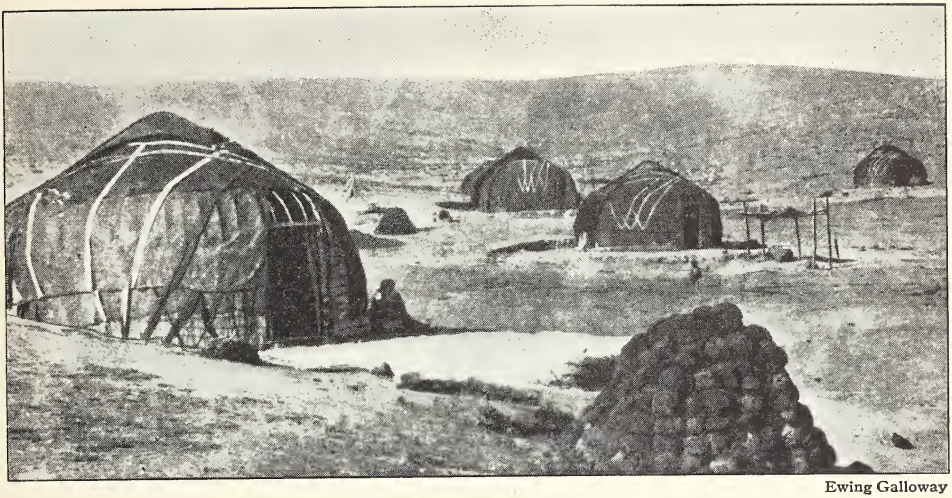
As the sun rises the morning chill passes. Hour after hour we ride on our animals, which seem more like ponies than horses, making our way toward the mountains which rise in the distance. Not a tent do we see, and, of course, no houses of stone or brick or wood. No towns or cities, no roads or railroads. Nothing but the broad steppe, with its grass and flowers.

Steadily we approach the mountains, which seem to rise taller and taller as we come nearer. We wind our way around gently sloping hills. Soon we can see that every mountain peak ahead is covered with snow.

Afternoon comes and then evening, and our guide tells us, "Must make camp now." Making camp is a very simple task on this Asian steppe. One of our horses has been carrying the willow poles and the latticework of a kibitka (tent) frame. These are set up like the one shown in figure 1. Large strips of felt are tied on the sloping dome with pieces of leather and ropes of wool. At the base are tied mats of reeds.

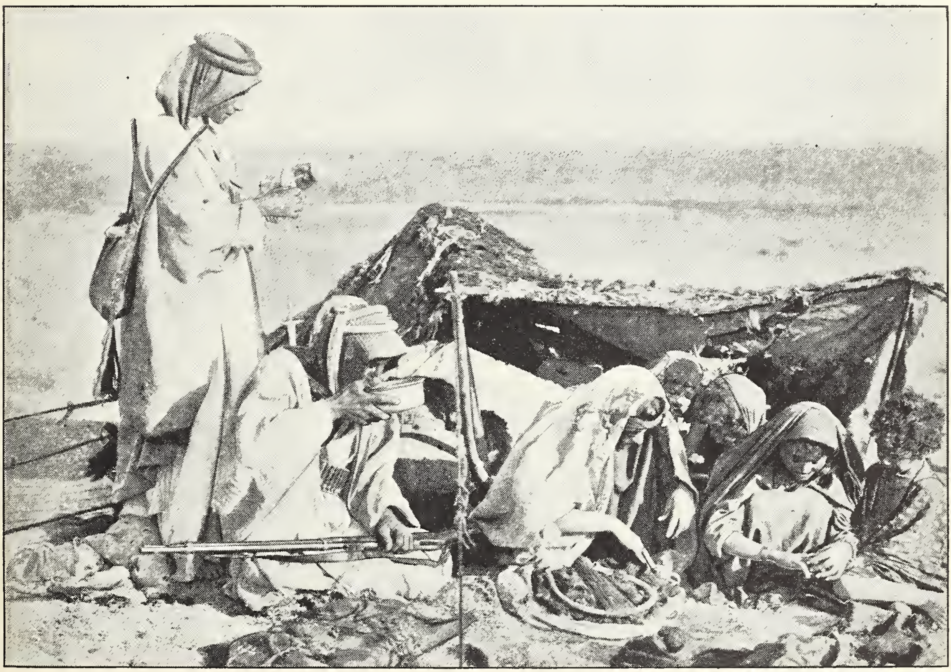
In less than an hour the work is finished. The house is not only built but comfortably furnished! Rugs of bright colors are laid on the ground. Additional rugs have been brought for blankets and beds. Home is complete for the night.

One of the Kirghiz builds a low fire in the center of the room, and a pot and a few other utensils are near at hand. The meat is heated over the fire, and water is boiled for the tea. After the food has been prepared we eat our dinner. By



Ewing Galloway

Fig. 1. What does this tell you about the civilization of the Kirghiz?



Underwood and Underwood

Fig. 2. These nomads, who roam over the plains near the Euphrates River, have a certain kind of civilization. Can you name some things which show it?

this time the air has become very cold. We are tired, and soon we go to sleep under the felt and rugs.

The next morning we rise and eat our breakfast under clear, sunny skies. Does it never rain here? Oh, yes, it rains very hard at times. But, taking the year as a whole, the rainfall is light — only about ten inches. "No wonder there are so few trees and no thick vegetation," we think. "Cold air and little rain and a long winter account for it. How geography does help to explain how things grow and, therefore, how people live!"

All day long we climb through the valleys of the hills. How strong our wiry, shaggy horses are! As we jog along we say to ourselves, "When man tamed the horse and learned to ride him, long, long ago, he provided himself with a good means of transportation!"

Just before nightfall we see in the distance a dozen little round knobs. "The village of Koorman!" grunts one of the riders.

What are the round knobs? They are kibitkas, like the one we slept in last night. These are the houses of the wandering Kirghiz tribesmen. Both rich and poor live in them. All are alike except that the rich man's tent is larger and the felt coverings are of better quality. It is more beautifully decorated, and the rugs, boxes, and robes in it are made of finer materials. But, wealthy or poor, all live in tents.

Our friend Koorman[1] and several companions come riding like the wind on their beautiful horses to greet us and take us to the tent which is to be our house. Soon we are there, and the welcoming feast begins. First the women bring in a huge bag made of skin (with the animal's hair on the inside). It is filled with a mixture called kumiss, which is made from mare's milk.

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[1] In writing this episode the authors are indebted for suggestions to E. Nelson Fell, *Russian and Nomad*. Duckworth and Co., London.

How our friends drink and drink and smack their lips over it! But for us, who are used to drinking sweet milk from cows, it is difficult to swallow, especially after seeing the thickness of it.

Then come more women, carrying a shining brass teapot called a samovar. In a pipe in the middle of it is burning charcoal to heat the water. Greasy cloths are spread on the rugs as "tablecloths," and the tea-drinking begins. We drink very little, but our hosts pour out cup after cup for themselves. Cream is served, and with it little pieces of hard bread. "Bread must be very precious," we think, as we watch Koorman's wife carefully taking a few pieces out of a silk cloth which has been locked up in a gaily decorated box.

"What different eating habits the peoples of the world have," we think.

But the big surprise is still to come. Up to the tent a man leads a fat mare to show us what the meat course of our feast will soon be. Then, to our amazement, the mare is killed on the spot and carried off to a cooking tent to be carved into pieces and boiled. This is done while we talk with Koorman and the others as they consume gallons of tea.

Two hours later the mare is served to us on steaming platters. As we watch, every bit of the animal is torn or cut from the bones and eaten.

What eaters the Kirghiz are! Sometimes they even have contests in eating. One champion, we are told, ate at one sitting a whole sheep and drank eight gallons of kumiss. He also drank two gallons of tea.

After the heavy meal singers come in with their wooden instruments known as "dombra." In shrill, wailing voices the men sing a song or two about the deeds of their forefathers. After the music Koorman says: "We pack before sunrise and start immediately for the higher plateau. Let us sleep."

The next morning, even before the sky is red with the coming sun, we are up. The women and children begin to take down the kibitkas and pack them. While they are busy the men collect their herds — horses and sheep, goats and oxen. Last night Koorman had boasted, "A thousand horses I have." Now we can see with our own eyes that he spoke the truth. A thousand horses there are. Among them are fat mares which have never been ridden or worked. These will make fine food, for their flesh will be tender. Many are about to have colts. There are large black and colored stallions, swift and strong of foot.

A score of two-humped pack camels are also part of the herd. A little five-year-old girl leads up a snarling camel by a rope tied to its nose. She makes him kneel down while her mother ties the tent, boxes and quilts, bags, and pots and pans on him. On top of the whole pack is a baby safely fastened in her cradle, but nearly smothered under the quilts. Near by a boy of three years is sitting on a little horse, waiting to ride away behind his father.

How quickly and smoothly everything has been done — all within two hours after a quick breakfast of tea and kumiss. Where before, a whole village of a dozen tents, thousands of animals and a hundred people stood, not a thing is to be seen! There are no scraps of food, no ashes of burning fires; all is cleared up. The village of the Kirghiz has disappeared, soon to appear somewhere else; for they are now on the spring march to the highland plateau.

What Kind of Civilization Have the Kirghiz?

As we jog along up the steep mountain trails we understand now why these people, rich and poor, live in tents. It is because they depend almost completely on their animals for their living.

Animals provide food — meat and milk and such things as kumiss, which can be made from the milk. Their houses and utensils are made largely from animal skins. They transport things by horses, camels, or other animals.

As you know, animals live on grass and other plants, so where the Kirghiz live depends upon where grass is plentiful. When spring comes, with its rain and warm sunshine, they travel for several days to a region of new grass high up in the mountain valleys. There they stay in their tents for several months, slowly moving about from place to place. For a week, two weeks, three weeks, they camp in one spot, while their animals eat bare the grassy plain. Then they pack up again — houses and furnishings — and move five, ten, fifteen miles away. Again they put up their tents and set up another camp for two or three weeks.

This kind of moving goes on throughout the spring and summer and autumn. In winter they go down to the steppes at the foot of the mountains where it is not so bitter cold as it is higher up.

Thus the life of the horseback Kirghiz herdsmen changes with the seasons, and all because they depend upon grass for their animals.

We see, however, that they are not mere food-hunters. They provide their food by raising animals — horses, cattle, sheep, and camels. And so they are not exactly like the simplest nomads, some of whom you read about in *Nature Peoples*. In their tents they live *settled* lives, even though they have to move on from one place to another. They have a kind of architecture, which consists of houses of felt cloth. Their few belongings are rugs, some shawls, a few pots and pans, some bags of skin for grain and milk and water, a few ornaments and jewels. These must weigh little and occupy a small space, so that they can be easily carried.

So it is that the Kirghiz have remained "grass peoples," living out in the open, moving their homes from place to place as nature compels them. Once or twice a year they drive their herds to a market fair, where they sell some of the animals and buy the things which they need. In this way they get wheat or other grains, different kinds of foods, cloth, boxes, tools and weapons, ornaments, and the like.

Year after year, generation after generation, they have lived on as wandering herdsmen. For hundreds of years, perhaps for thousands, this has been their way of life. They love it, and would not change it for any other.

And we conclude, as we jog along the plateau trail, that the Kirghiz have a fine civilization.

Is the Kirghiz Way of Life Civilization?

"But is this civilization?" you are asking. Yes, students of the different ways of living would no doubt say that the Kirghiz are civilized; that their ways of living can truly be called civilization.

What, then, do we mean when we say people are civilized?

Before we answer that question let us study more examples of ways of living to see if they show what civilization means. We shall begin with some very simple peoples.

2. The Tasmanians: Wandering Food-Gatherers

On the island of Tasmania, near Australia, there lived at one time the descendants of a tribe of black-skinned people. For no one knows how long, these Tasmanians carried on very simple ways of living. They did not know how to plant seeds or to grow crops or to raise animals for food. They were

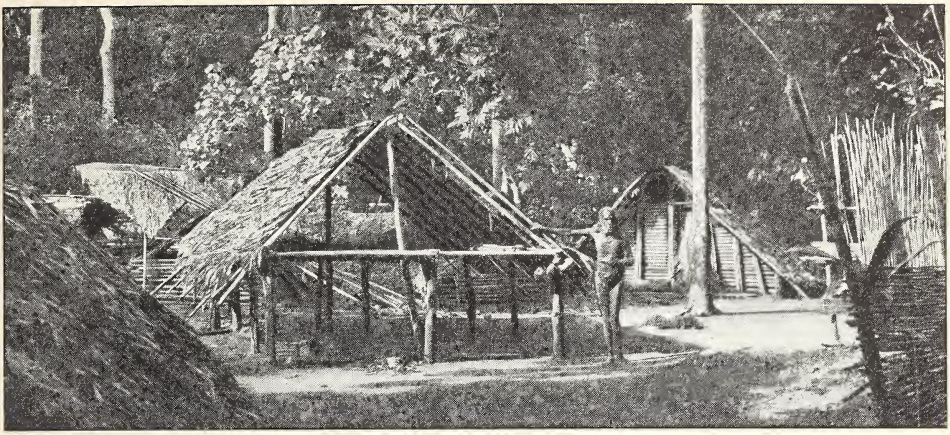

FIG. 3. Are these huts built by the natives of the New Hebrides examples of shelter or architecture?

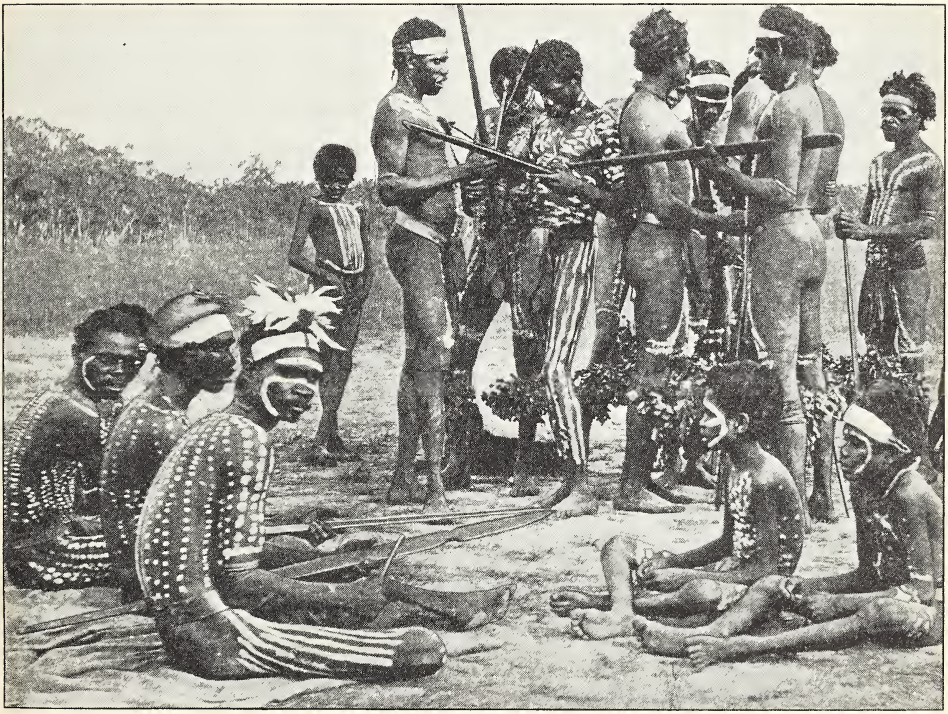

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FIG. 4. Can you tell which arts these natives of the wilds of Australia have developed?

wandering food-gatherers. From place to place they moved, hunting snakes, lizards, ants, and worms. Along the seacoasts in winter the women gathered oysters, crabs, and other shellfish. In the summer the tribe moved inland, where the big-game hunters among them speared kangaroos and other animals. Sometimes a dead whale was washed ashore. This was a time for great rejoicing, and a feast was held.

Like other nomad peoples about whom you know, the Tasmanians did not live in houses as we know them. They squatted behind windbreaks made of branches of trees or strips of bark laced together. Even in the coldest weather this was their only shelter, and behind it they huddled near a fire. They guarded the fire with their very lives, carrying burning sticks with them wherever they went.

Stone knives and scrapers which have been found show us that the Tasmanians were "Stone Age peoples." They did not know about tools or implements of metal; nor did they have pottery or woven cloth. Perhaps a few nets or baskets made of leaves laced together served as containers. In warm weather they usually went without clothing. In winter they threw the skin of a kangaroo over their shoulders, and sometimes wore moccasins on their feet.

This, then, was the life of the Tasmanians. The simplest, the crudest, of all human ways of living were theirs. Do they remind you of the Bushmen of the Kalahari Desert in Africa or of the Ona of Tierra del Fuego in South America?

Would you call these peoples civilized? Would you speak of their ways of living as the "Tasmanian civilization"? Perhaps you might, but the students of such problems do not. They use the word *civilized* to describe peoples who live in more advanced ways.

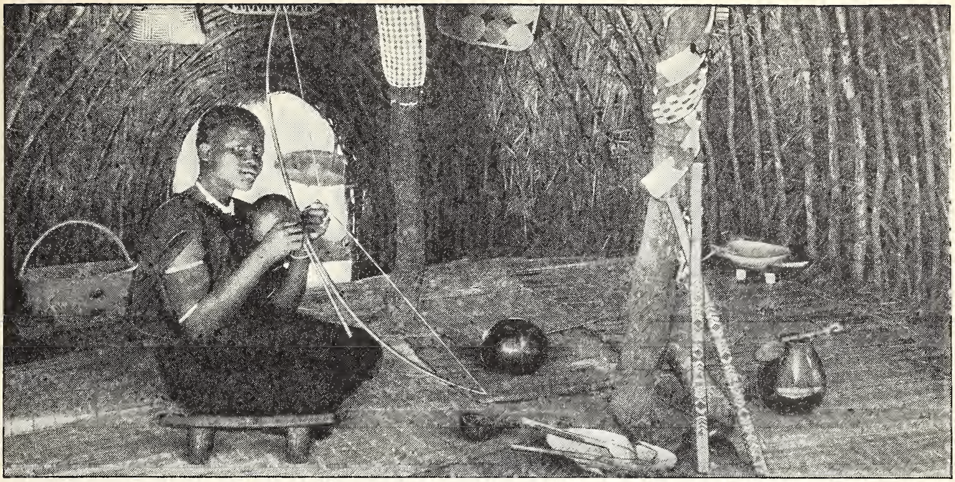

Fig. 5. In the homes of the Zulus of southern Africa are many things which tell us about their civilization. Can you tell what they are?

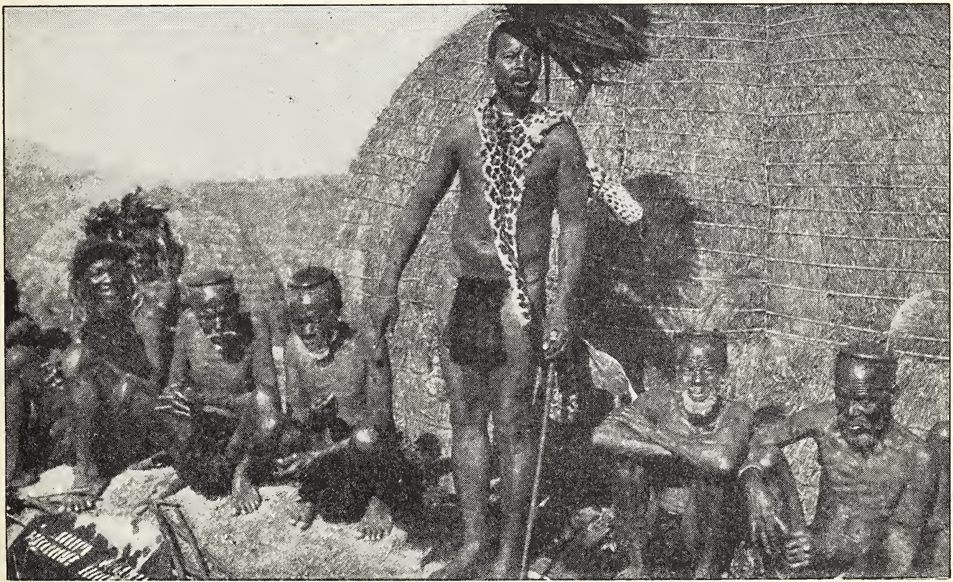

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Fig. 6. This Zulu chief and the old men of the tribe are holding a trial. Does this way of governing the people show that they have a certain kind of civilization?

3. Simple Food-Producers

Let us think of a few nature peoples who seem to be more advanced than the Tasmanians. Do you remember the story of the Fang of Andor, who live on the Ogowe River in west-central Africa? Their way of living is perhaps one of the simplest on earth, but they do live in houses, raise food, and make clothing, tools, and utensils. Theirs can be said to be a kind of civilization.

Recall also the Nagas, who live in the hills of Assam, India. Here many families live together in settled communities; there is no wandering about from place to place. They raise rice and other foods on the terraces which they have built on the mountain sides. They raise pigs and chickens and have tamed animals to help them to do their work. They build large houses of wood and stone. Heavy walls surround their villages to protect them from their enemies. Each village chooses headmen to make rules which the people must obey.

In the tropical island of New Guinea, north of Australia, live the fuzzy-haired Papuans. Is their way of life a civilization? Yes, perhaps one should call it that. Certainly the people are settled. They live in one permanent place. They know how to raise food from the ground. They can build houses with their rough stone tools. They have sailing canoes in which they travel far and wide across the seas to trade with other peoples. They have a government to manage their affairs. And they have the arts of sculpture and painting, even though they do not read and write and make books.

For these reasons the Nagas and the Papuans can be thought of as more civilized than the wandering food-gatherers.

4. The Highly Civilized People of Bali

On the beautiful island of Bali, in the Pacific Ocean, lives another interesting settled people. Although the island is formed of mountains rising from the sea, with valleys between, the Balinese use almost every foot of land for farms and villages. Their rice fields are planted in terraces which have been built up and down the mountain sides. Their reservoirs and irrigation channels are surprises to our engineers. They live as separate families in well-built houses of bamboo and stone and brick, and the families live together in peaceful communities, obeying the laws of their headmen.

The Balinese have also learned to make their ways of living beautiful. Gardens of exquisite flowers surround their houses. Their temples are designed and decorated. They make musical instruments and have remarkable orchestras. Much time is spent in festivals and plays, and in these the dancers wear lovely garments of woven and decorated cloth.

Because of their settled and peaceful ways of living we say that the Balinese are not only food-producers; they are also a civilized people. They are more advanced than the cruder nature peoples; that is, the Balinese have gone forward in inventing better ways of doing things.

There are many other simple food-producers. In Africa alone there are perhaps 900 tribes living in these very slightly civilized ways. There are hundreds of others in Asia, in Australia, in South America, in North America.

And yet, except in Africa, the total number of these simple food-producers on the earth is small. Many of them are hidden away in unknown corners, so that people do not know much about them.

5. Most Peoples of the Earth Live in Countries with Advanced Civilizations

But there are other peoples about whom we hear a great deal. Stories of what is happening to them are in the newspapers every day. Pictures of them are shown in the movies. They are talked about over the radio. Many books are written about them. These are the peoples of the more civilized countries.

We shall name a few examples. See if you can recognize them.

In far-off Asia there is a country called China, which has more people than any other country on the earth. The Chinese are a very ancient people, and, with their vast numbers, there is no knowing what an important modern people they may become. Because of their future as well as because of their great achievements in times past, we shall wish to know more of the story of that wonderful country.

In the vast continent of Asia there are two other huge countries — India and most of Russia — and several small ones. Among the smaller ones are Iran and Turkey, Syria, Iraq, and Palestine. These are old countries too. Their people probably farmed the land 4000 and more years ago. They were also craftsmen and builders, living in towns and cities. Today they have their own languages; they write books, paint pictures, and build beautiful buildings. Some of them make things with machines.

These countries differ in many ways among themselves, but all of them are civilized. Their ways of living are called civilizations.

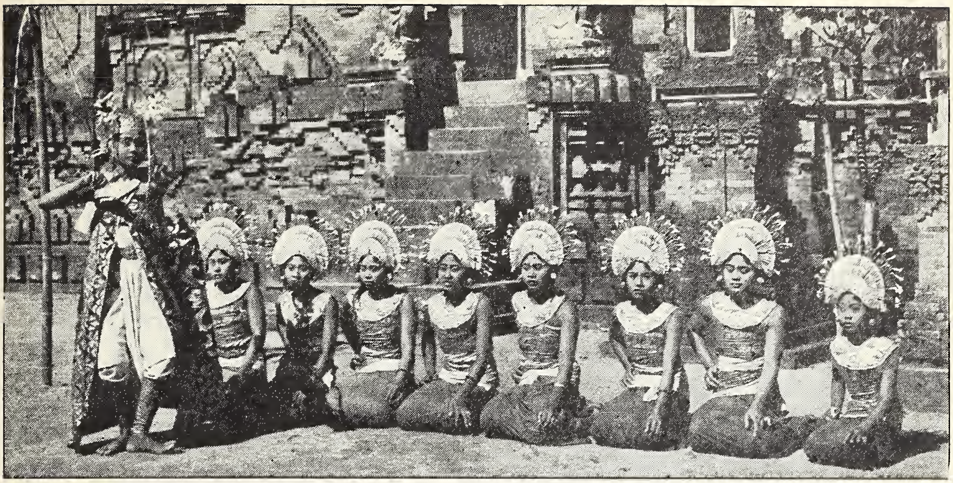

Fig. 7. A group of dancers of the Satrya Temple in Bali. In which ways would you say that the Balinese had developed their civilization?

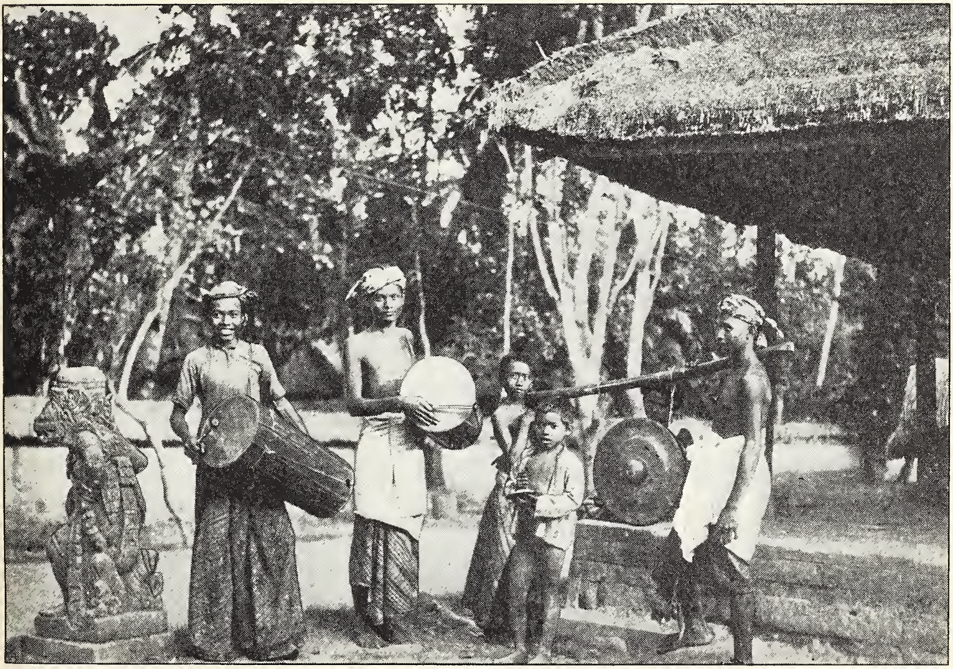

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Fig. 8. What do these musical instruments of the Balinese tell us about their arts and crafts?

In the little continent of Europe are several hundred million people called Europeans. They do not, however, form one country like China, but are divided among 29 countries. They are 29 different peoples, making their homes in villages, towns, and cities or on farms. Among them are the British, the French and the Germans, the Belgians and the Italians, most of whom cultivate their land with machines, have factories and mines, power stations and railroads, and large armies and navies. There are others, like the Spaniards and the Danes, the Poles and the Yugoslavs, most of whom live as farmers on the land.

Although the continent of Europe is small and is divided into many countries, the European ways of living have spread to Asia, Africa, and Australia, and to North and South America. So we shall wish to study more about this "European civilization."

In Central and South America, Mexico, and the West Indies there are twenty other advanced countries — twenty different peoples, twenty different civilizations. One of these, Brazil, is larger than the United States. Others — Argentina, Chile, Peru, and Mexico (to name only a few) — are smaller and have fewer inhabitants. Yet each one is a country with cities and towns and with well-developed farming and industry, railroads and shipping, government, arts and crafts; in fact, all the ways of living which we call civilization.

What is Meant by the Different Civilizations?

Can you tell now from the examples given what is meant by civilization? When we speak of British civilization we mean all the ways of living of the British people; that is, how they produce food on their farms, manufacture goods in factories, run power plants, railroads, and other machine industries. In the same way we speak of the Chinese ways of farming by

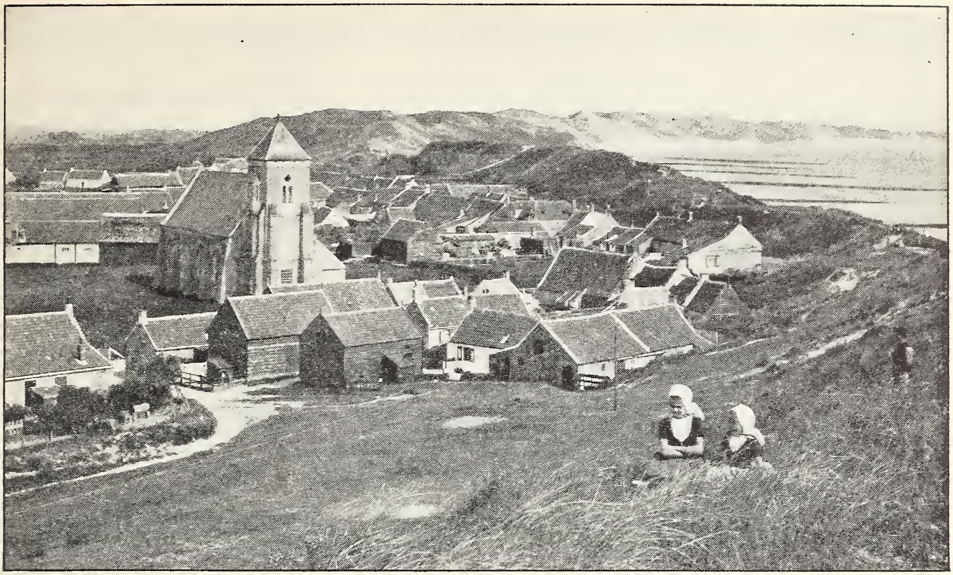

FIG. 9. A farming village in Holland built along the coast below sea level. Does the picture suggest some things about the civilization of the Dutch?

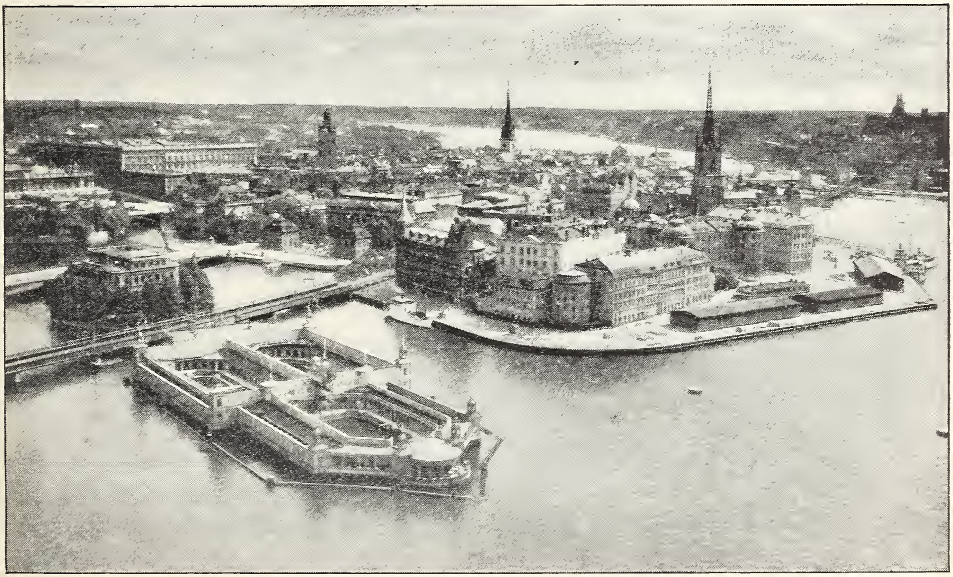

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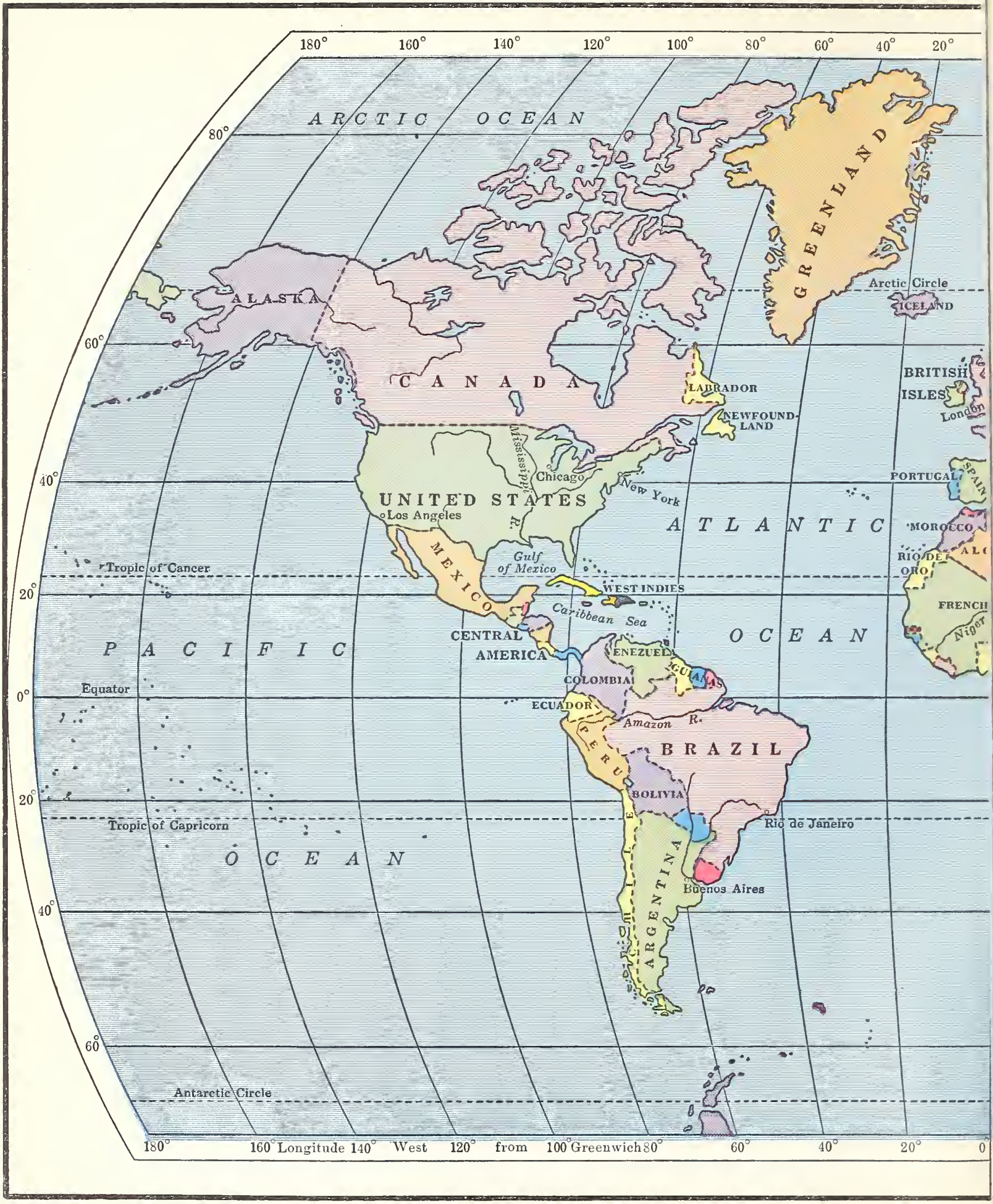
FIG. 10. Stockholm, Sweden, is one of the large port cities of the world. What does that tell you about the industrial life of the people?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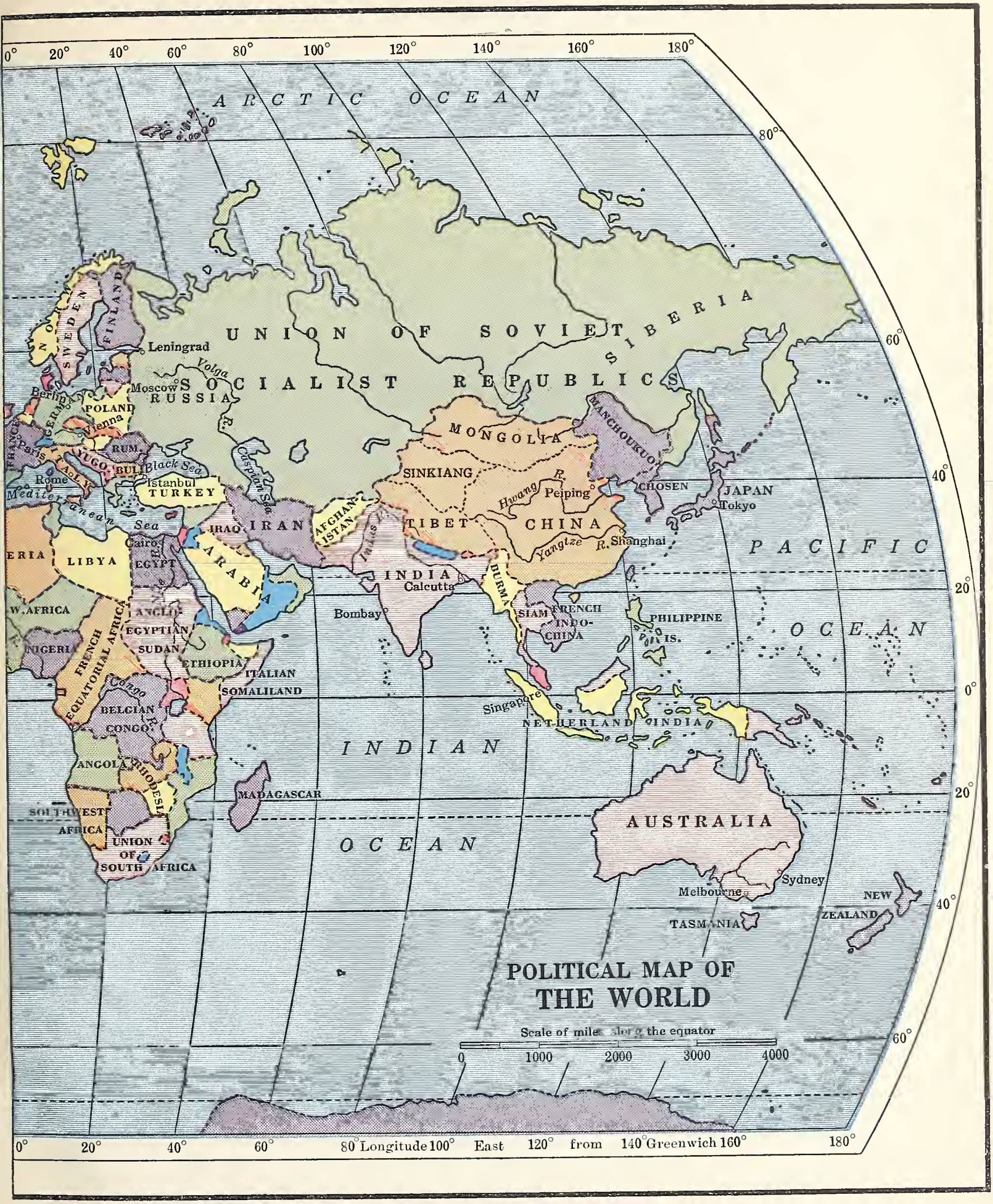
UNITED STATES
Los Angeles
ATLANTIC
MOROCCO
MEXICO
Gulf of Mexico
RIO DE ORO
AL
Tropic of Cancer
20°
WEST INDIES
Caribbean Sea
FRENCH
Niger
CENTRAL AMERICA
PACIFIC
OCEAN
VENEZUELA
GUIANAS
COLOMBIA
Equator
0°
ECUADOR
Amazon R.
PERU
BRAZIL
BOLIVIA
20°
Tropic of Capricorn
Rio de Janeiro
OCEAN
CHILE
ARGENTINA
Buenos Aires
40°
60°
Antarctic Circle
180°
160° Longitude 140° West 120° from 100° Greenwich 80°
60°
40°
20°
0



POLITICAL MAP OF THE WORLD

Scale of miles along the equator

hand, sailing sampans or junks, traveling by donkeyback or ricksha, eating rice and beans, and the like, as examples of Chinese civilization. So it is with the people of each one of the 74 countries of the world, and the advanced island peoples like the Balinese.

Do you see, then, that although *civilization* is a long word and seems at first very difficult, it has really a rather simple meaning. Think of it merely as "all the ways of living" of certain peoples on the earth.

We Shall See These Civilizations Growing

In this book we shall try to find out how these different ways of living — these different civilizations — grew. To do that we must study their history.

How far back shall we have to go? How long ago did they start? Naturally, the answer will be different for different civilizations. Think for a moment about our own United States of America. From your study of the *Building of America* you can recall the dates when the first settlers came from Europe. How many years old is our country?

How old is British civilization? From *Peoples and Countries* perhaps you can work out how old it is. Is it 500 years old? 1000 years? 1500 years? Try to find out.

What about China? We learned that it was one of the oldest countries in the earth today. How old is it?

Are there any peoples on the earth who have a history older than that of the Chinese?

In the next few chapters we shall find the answers to these and other questions. We shall begin in Chapter II and go back and back through history. There we shall get a glimpse of how scientists think things might have been on the earth even before civilizations began.

CHAPTER II

A Balloon Trip through History

IMAGINE FOR a little while that it were possible to be knocked into the far-distant past like Mark Twain's "Connecticut Yankee." And suppose that you could start out many million years ago in a balloon which drifted in a zigzag course around the world every million years or so. What would you see in your trips around the globe?

Probably you would be able to notice certain changes in the earth every time you went around it. The climate in each part would be somewhat different almost every trip. If you watched closely, you would see that the shape of some seacoasts was different, and you would see that changes had been brought about by earthquakes and volcanoes. You would see different animals and plants spread over the earth in different patterns and groups.

Toward the end of your journey you would see men increasing in number and spreading to new lands. Finally you would see that in some places they had succeeded in changing the face of the earth almost as much as had one of the great ice caps. You would find that while mountains, rivers, lakes, and seas remain practically unchanged by man, millions of square miles of forests have disappeared under his ax. In their places stand fields of grain, orchards, roads, and cities.

How did such vast changes come about? And who are these creatures who have done so much more to the earth than have any of the other animals? Our knowledge of the past up to 6000 or 8000 years ago is very hazy — made up of a few facts here and there pieced together. Therefore we cannot get a very clear picture of what the world looked like before what we call civilization began; but from what is known we can get a general view.

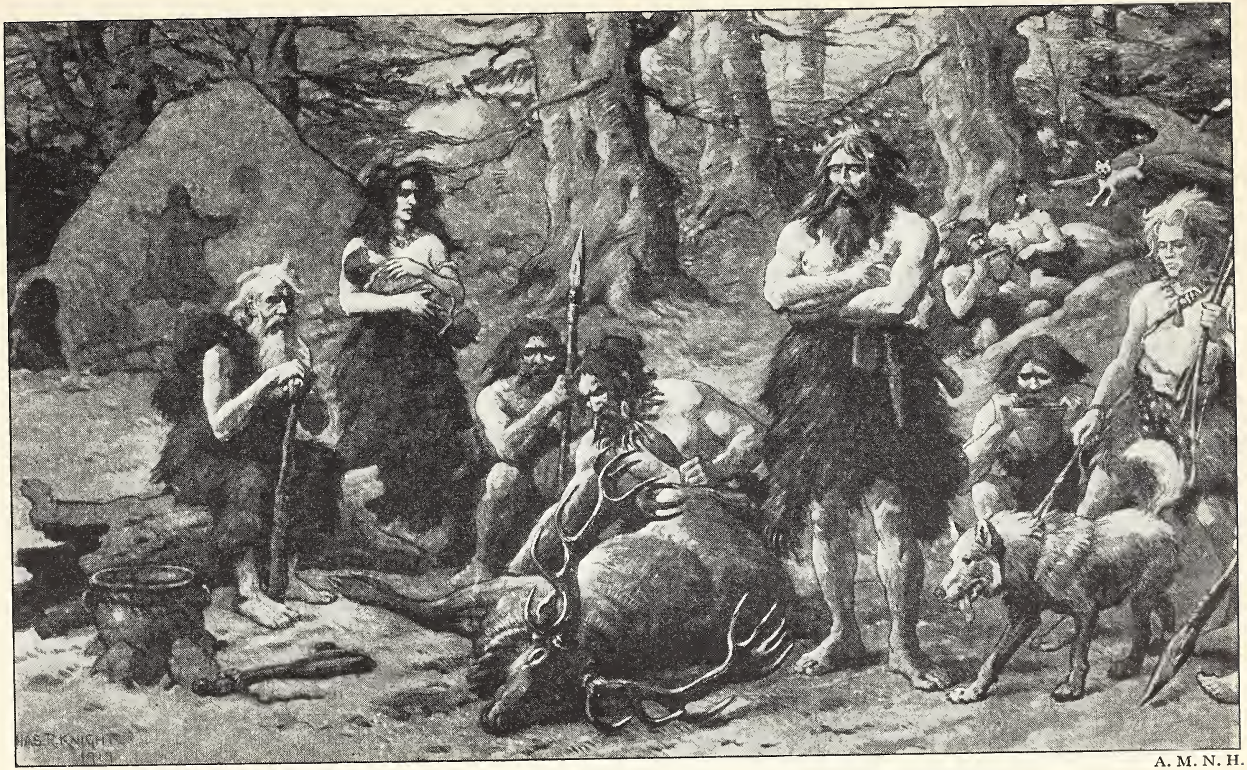
Let us try it and see. Make yourself comfortable in the basket of your balloon, for you are to stay there for several million years. There is a clock fastened to the side of the basket. But it is a strange one! The minute hand moves just one space every 10,000 years. One hour on the clock is 600,000 years. You will need a long-time clock on this trip.

Now let the years rush backward by the thousands . . . yes, by the hundred thousands . . . yes, by the millions!

Open Your Eyes on the World of 20,000,000 Years Ago

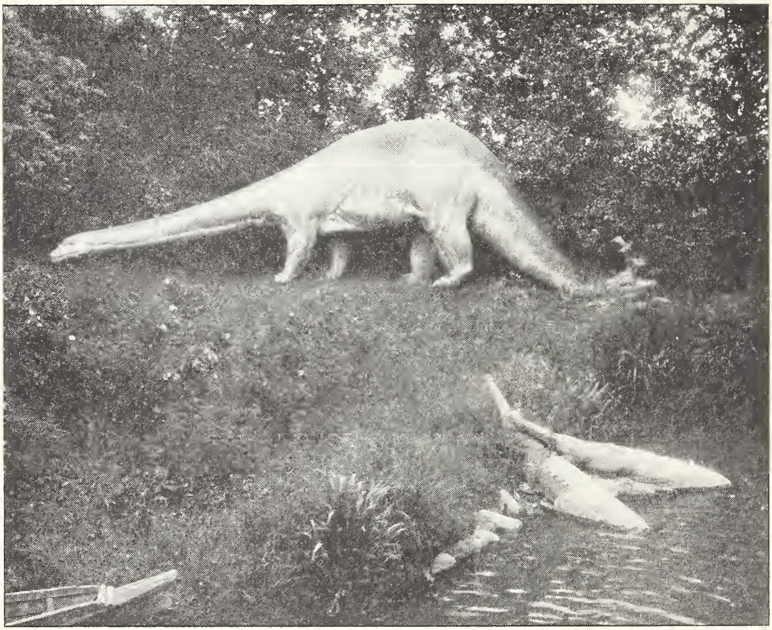
You rub your eyes and look around as the balloon floats lazily along. You look up. The sky is blue like many a sky you have seen before. You look down, far down, for you are high above the earth. There you see blue water stretching as far as the edge. This must be an ocean. Rising out of the water is a mass of land. Are those weeds? You laugh at yourself. You are so far away that a forest of tall trees looks like a vast field of weeds. There is something vaguely familiar about that shore line. Yes, it must be the eastern coast of North America.

You are following the shore line west and then south. This must be New Jersey, you think, as you look down on the green forests. A little to the west are the Appalachian Mountains. But there is something queer about the shore line to the south. Where is the peninsula called Florida? It isn't there! And look beyond, toward the southwest. North America is cut off from South America! Well, this is certainly a strange world!



A. M. N. H.

FIG. 11. An artist shows men of the New Stone Age in their community. How far had they advanced in civilization?



Ewing Galloway

FIG. 12. In your trip millions of years ago you might have seen this giant reptile, Brontosaurus. You could not, however, have seen the two crocodiles of today

Now and then your balloon has dropped closer to the earth, but as yet you have seen no sign of man — no cities or villages, no roads, no people themselves. There are many animals, however. Some of them are huge creatures such as you never have seen before; others are curious little horses.

You are drifting northward. You follow the Rocky Mountains, which look much as they do today; but when you reach Alaska, you find that Asia and North America are connected by land. Now the wind changes and you drift to the west. What is this? A great ocean in the middle of Asia? You float on and on southward over the blue water. There is land beyond — a pleasant land — covered with deep forests. The balloon descends quite close to the treetops. Your ear catches a chattering sound. Monkeys! Surely this cannot be! This region should be Tibet, the cold, unwooded roof of the world. But now the land is low and green with trees!

The balloon continues westward. Should you not be reaching Africa? Yes, there it is. But — how strange! Africa seems to be connected with Asia by a broad strip of land on the east. And on the northwest, near Spain, it is connected to Europe by another strip of land.

"A queer world, indeed," you think. You do not see a man or any sign of one. You grow drowsy. You will take a little nap, you think, as you travel back toward America.

How the World Looked 10,000,000 Years Ago

You awake with a start and look at your clock. Heavens! Ten million years have passed since you climbed into the balloon.

You look down. Where are you? Well, that looks more familiar. North and South America are almost joined together. Off in the distance, to the northwest, you see a strange cloud which seems to pour out of a mountain. A volcano!

The balloon moves on. It crosses the Pacific Ocean this time; but as you look back, you see off to the north that Asia and North America are still connected. Now the shore of Asia is in sight, and soon you are floating over the huge continent. The inland sea lies to the north of you, but it seems smaller than it did before. The forest is certainly thinner, and off to the south there are mountains where before were wooded lowlands!

You drop slowly toward the earth. That must be a little beast walking across a field of grass down there. You come still lower. The little animal looks up frightened and scuttles away.

Did you ever see anything like it? He's walking on his hind legs. And his expression of fear was strangely human. Funny animal, but he does look like a man!

But here are more of the same kind. A whole group of them moves across that field and off into the forest at the south. Another group — another — and another. What can it mean? Are they some kind of men?

No one is there to answer your questions, and the balloon continues round the earth. But only in Asia can you see the funny little creatures that look like men. "After all," you think, "a world without men is stupid enough." And so thinking, you drop off to sleep.

The World 1,000,000 Years Ago

When you awake you examine your clock, and you are not so surprised this time, though there is more at which to be surprised. Nineteen million years have passed since you began your strange journey! Your mind cannot take hold of such vast stretches of time.

You look down, wondering where you are. Below is an ocean, and far ahead is land. High up in the air you can see the coast line for some distance. It must be the eastern coast of Asia. And this time it bears a closer relation to your maps than it did on the earlier trips. The inland sea has disappeared, and southwest of China there are mountains and plateaus.

Now, again, the balloon descends. What are those creatures just below? Into your mind flashes the picture of those manlike animals you saw before your nap. But these are much more like men. True, their bodies are very hairy, and their faces are rather apelike, but not entirely so. They walk much better than the other little beasts did, too. But the balloon moves on, and quickly the strange creatures are left behind.

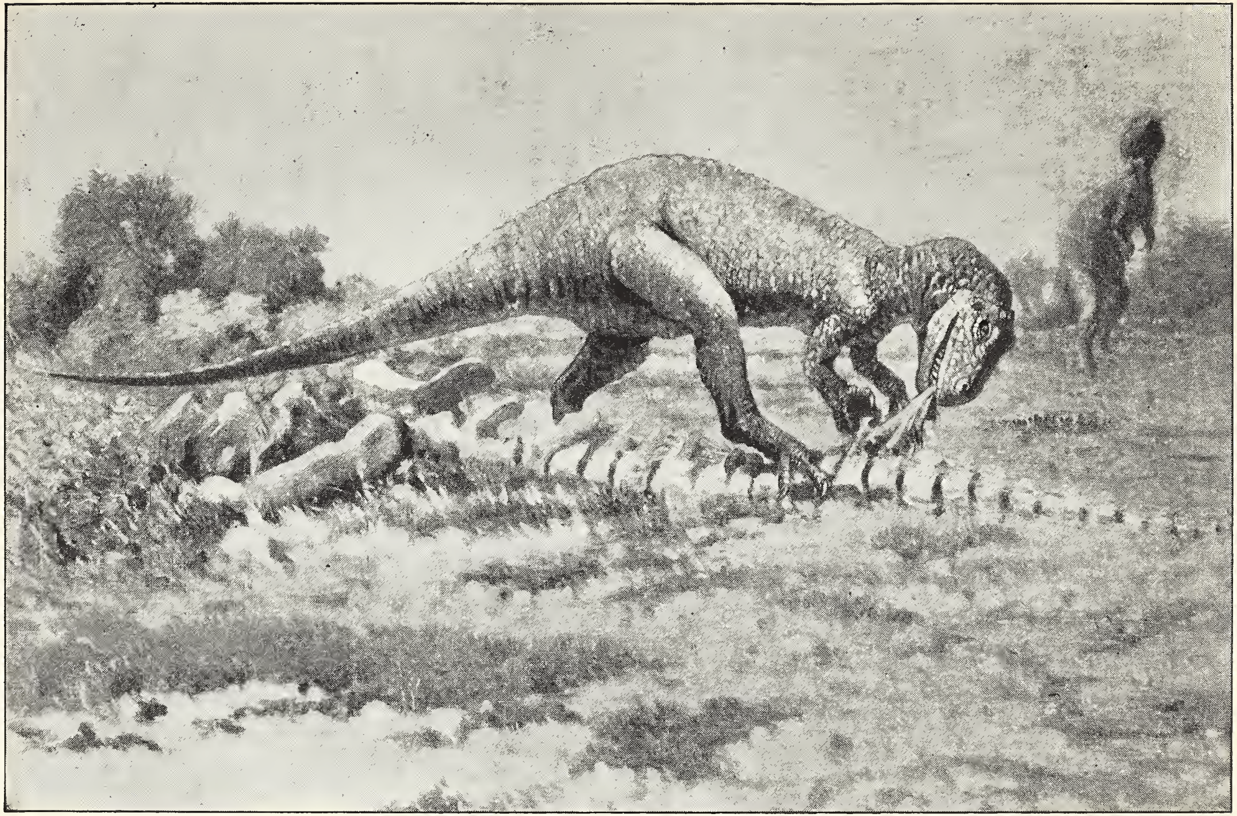


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Fig. 13. A giant dinosaur eating a weaker reptile. These reptiles ruled the earth for many, many years

You are evidently approaching the Mediterranean Sea. Yes, there it is, as bright a blue as the stories describe it. But that's queer. Italy and Africa are joined by a bridge of land. And far off to the west you see that at Spain the land-bridge still joins the two continents.

Now the balloon turns north and west toward Great Britain. What's that? There is no English Channel! Only a river flows along, and the land of Europe continues north as far as you can see. There are no British Isles; they are a part of the mainland.

On to the north you go. It grows colder and colder, and you shiver. More land comes into view, but no green grass is to be seen. A sheet of ice covers everything. You draw back from the sight. The sun is darkened. Black clouds lie above you, and around you is a damp, penetrating mist. The balloon seems to go lower, and you wonder if you are to end your travels by freezing to death.

A blast from the north catches your balloon and carries it southward. Here again are green lands, and you are glad to see the sunshine once more. You continue your circling round the southern part of the globe until, happy in the warmth, you drop off to sleep.

The World 50,000 Years Ago

You soon wake up cold and shivering. You look at your clock. Nineteen million nine hundred and fifty thousand years have passed since you began your trip! It is 50,000 B.C.!

You are in the same place that you were when you went to sleep. But how changed things are! The land below is cold and bleak and stormy, like that which you saw much farther north last time. You are in northern Europe, and northern Europe is again covered with ice.

The balloon turns south. This is better. It is still cold, but here the ground is not covered with a great sheet of ice. There are scraggly trees and bushes. Farther south you go, and now the vegetation is thicker. Is that a fire below, where smoke is rising? The balloon descends. Yes, there, under the cliff, is a fire with forms around it. They look very much like men and women. Some are tending the fire; others are sitting near by, eating. Yet surely they are not men of today; for their legs are bowed out, and they are strangely wild-looking.

On to the south now, and Italy lies below you, still joined to Africa across the Mediterranean. There a little group of creatures goes trudging along toward the north. Are they men? Yes; with rather fine-looking bodies, too, big and brawny, not stooped and bowlegged like those in the north. What is that group doing? Hunting, apparently. They are following a huge elephant-like animal. But you do not see whether or not they catch it, for you are swept away from the group into northern Africa.

Well, well, here are men. Some of them look much like those whom you have just seen in Europe. Others are more like Negroes, with black skins and curly hair. You begin to feel quite at home in the world now, with all these people about. You do not want history to pass too quickly. You change the time clock in the balloon so that the minute hand moves one space for every fifty years. Events are now passing before your eyes two hundred times more slowly than before, and yet great changes are taking place.

You travel across the stormy Atlantic until the wooded shores of North America come into view. Farther to the north are fields of ice covering the entire northern part of the continent. Toward the south the land is green with vegetation.

Will you find men here? You pass over the forests, over the Appalachians, over the plains, over the Rockies. Ah, there they are! You see below you what seems to be a camp. The balloon descends. Rather good-looking people, these. A little like the ones you saw traveling into Italy, perhaps? No. Perhaps somewhat like the American Indian? Not quite. Well, however they look, they are people.

The balloon does not stop to let you satisfy your curiosity farther. It moves out over the Pacific.

A heavy drowsiness comes over you, and you drift into a dream of wild men hunting wilder animals.

The World 10,000 Years Ago

When you wake up you glance at the clock. Forty thousand years have gone by! It is now the year 10,000 B.C. You are so far above the earth that you cannot see very clearly what is happening below. But from the few glimpses you can get you realize that in some parts of the world people are beginning to live together in fairly large groups.

You don't realize this until you have passed far beyond China, and you wish you could go back to see if people were really gathering together there in great numbers or if you only imagined it.

Of this you are certain, however. In the Mesopotamian valley between the Tigris and Euphrates rivers and in Egypt along the river Nile, human beings are living in settled communities instead of in roving bands. Higher up on the plateaus are wandering herds of cattle and men, and wild tribes have camps in the deserts and mountains. At one spot there seems to be confusion which looks like a battle. That is just what it is. A crowd of men from the mountains are fighting those who live near the river. The shores of these three rivers — the Tigris, the Euphrates, and the Nile — are so thickly populated that you think of ants gathered about a stream of molasses.

A few things like boats seem to be floating on the Nile. Yes, one or two are even going out into the Mediterranean toward the island of Crete. You look more closely at this island and are almost certain that people are moving about. But before you can see how they are living together, the wind carries you over Italy and beyond.

Now France is below you, covered with the forests you have seen so many times before. Here and there is a clearing among the trees. Could that possibly be a field planted with grain? And those must be huts at its edge. A man sits outside one of them working on something. A little farther on, a herd of cattle is grazing on a hillside. But there are very few such signs of settled life. For the most part the land is still uninhabited.

You resolve not to sleep for so long a time again. Such interesting changes are taking place on the earth that you must not miss them. But you think you will take a cat nap of a few hundred years while the balloon is crossing the Atlantic.

The World of 5000 Years Ago

When you wake up you look at your clock. How provoking! You have slept nearly 5000 years! You decide that you had better change your time clock again. You adjust the minute hand so that it moves one space in five years. Now, if you fall asleep, one hour is only 300 years, and you will not miss so many interesting changes. You realize that since you took your last glance at the people gathered along the Tigris, Euphrates, and Nile rivers, many generations have been born and have died. You are now in the year 5000 B.C.

You look at the earth to see where you are and find that China is just fading from view. You quickly reach for your telescope, but it is too late for a clear picture. You see what you think are the houses, palaces, and plowed fields of a civilized country, but a high wind carries you very rapidly over the Himalaya Mountains.

To the south is India. With the aid of the telescope you can see clearly some white buildings along the rivers. They look like temples. How you wish you could look more closely, to be sure whether or not the Indians had developed a civilization.

But your balloon sweeps over Mesopotamia. There are the two long rivers — the Tigris and the Euphrates — flowing into the Persian Gulf, with a fertile valley between them. You notice the half circle of green that reaches from the tip of the Persian Gulf nearly to the Red Sea. Ah, the "Fertile Crescent"!

What a change in Mesopotamia in the 5000 years that have passed! If you had not seen it before, you would not have believed that you were looking at the same valley. Many of its mud houses with thatched roofs have been replaced by magnificent brick buildings. There are ships on the Tigris, carrying freight of all kinds.

People driving oxen are plowing on the plains, but their plows are very different from any that are now in use. However you have no difficulty in knowing what they are doing. The men stop to rest just as farmers do today. Here they chat for a while; there a child brings a drink to his thirsty father. Finally the men stretch, spit on their hands, and again whip up their oxen. And what are those ditches and reservoirs? Why, they're canals for irrigating the land.

You look at your clock to make sure that this is not the same Mesopotamian civilization you saw in pictures in a magazine in the 1930's A.D. No, you were correct the first time. It is 3000 B.C., about 5000 years before you were born. "Well," you think, as your balloon begins to rise once more and drift toward Egypt, "men in this region haven't changed so very much in the last 5000 years."

Your balloon passes over Mount Sinai. In this region too you can see that the people have been very busy since you last looked down upon them. There are huge figures carved in the rock, and a copper mine has been dug deep into one side of the mountain.

As you float over the Nile and follow its muddy current toward the Mediterranean, you see huge pyramids. How could these people without cranes and derricks build such enormous monuments? You don't have long to wonder, however, for soon you pass one which is being built. Here thousands of people are at work. Some are bringing huge rocks down the Nile in boats. Others are dragging them up the banks of the river, putting rollers under them or pushing and pulling and prying them up the inclined planes which are alongside the pyramid.

You look out over the Nile, its water shining like a mirror in the blazing sun. Boats, boats, are everywhere! Scarcely any two of them are alike, but you can see at a glance that the Egyptians have become experts at boatbuilding.

As you move off toward northwestern Europe, you wonder if there too you will find pyramids and ships. But there is certainly nothing modern here. The people are still farming and keeping herds in very simple ways. They seem to have increased in numbers, and they have spread out over the land, but there is little sign of "civilized" ways of living among them.

You wonder why this is true. It occurs to you that perhaps it is easier to move and to burn off new land than it is to learn to make a little land support many people. "Then, why didn't the Egyptians move?" you ask yourself. But thinking so hard and seeing so many things has given you a headache, and in spite of yourself you drift off into a light sleep.

A View of the World 2500 Years Ago

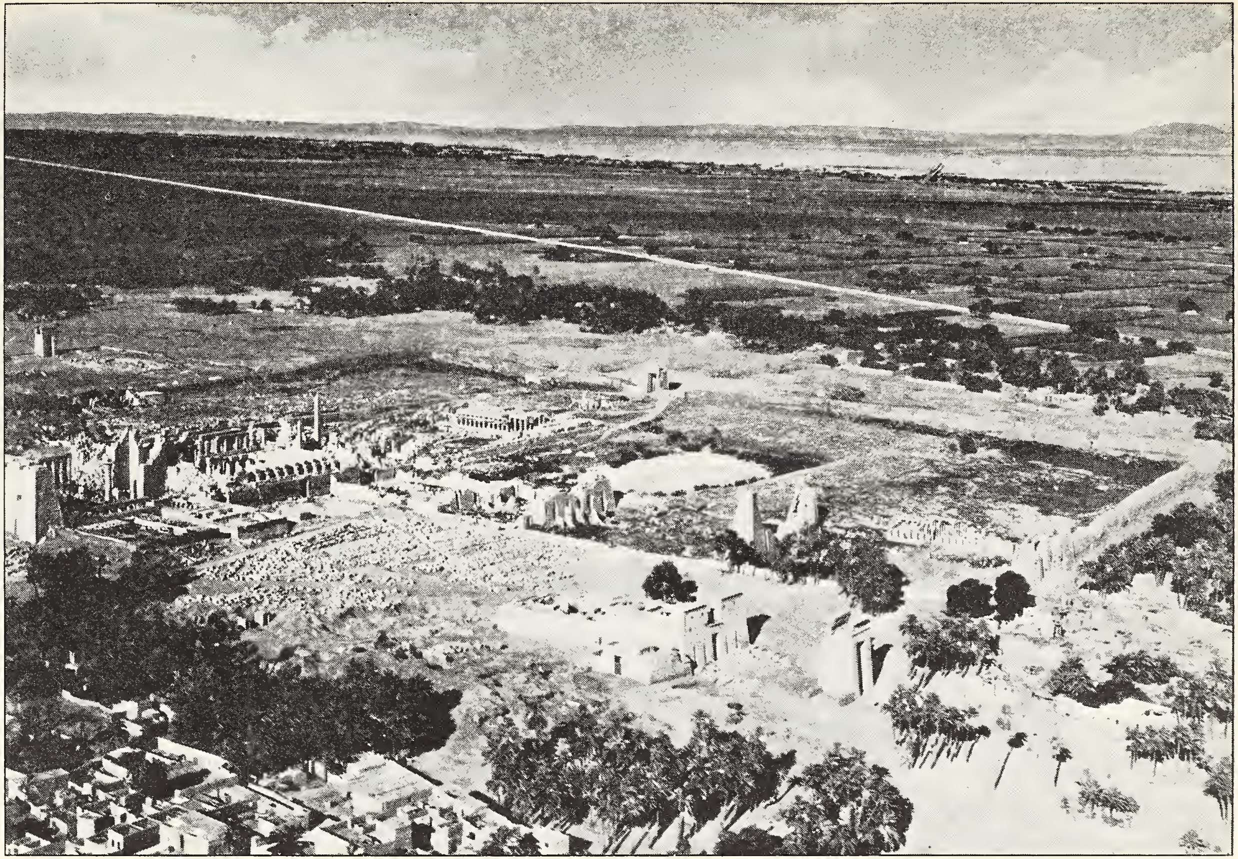
You soon wake up in the year 500 B.C., just as you are sailing over the long chain of islands that is called Japan. You are too far away to see that large city very distinctly, but the Japanese towns and villages are just beneath you. Handsomely carved dragons and huge bronze bells decorate the temples. Soldiers are riding on horseback, and people walk on the streets and in the crowded markets. Beyond the villages the fields are cultivated, with rice and vegetables and fruits.

As you pass westward over the Himalayas you have a view of India in the distance. Many beautiful brick buildings with domes stand out clearly. It takes a skilled mason to make a brick dome; so India too must be pretty well civilized. There are other signs, too, of advanced ways of living.

When you come to the Fertile Crescent of Mesopotamia, you find that people have now settled on nearly the whole region from the Persian Gulf around to the Mediterranean Sea. Things have evidently been moving very rapidly during the past 2500 years. There is a bridge across the Euphrates. Towers and monuments rise above the beautifully adorned buildings. There is a new palace, with hanging gardens. A wall stretches all the way from the Tigris to the Euphrates. Signs of civilization are everywhere.

When you reach Egypt again you notice the same kinds of changes. And as you float out over the Mediterranean hundreds of elaborate ships, laden with merchandise, are sailing far and wide.

You drift on northwestward until you reach the shores of Greece. That must be the city of Athens. What wonderful buildings painted with exquisite colors! And the marble figures adorning them! Do you think the sculptors who made them could learn much from the artists of today? There is



Ewing Galloway

Fig. 14. The ruins of Karnak show how the Egyptians of 3000 years ago had developed their architecture, as well as other advanced ways of living

the open-air theater where a comedy is being played. Beyond an athletic contest is being held at Marathon. Students are reading in the garden.

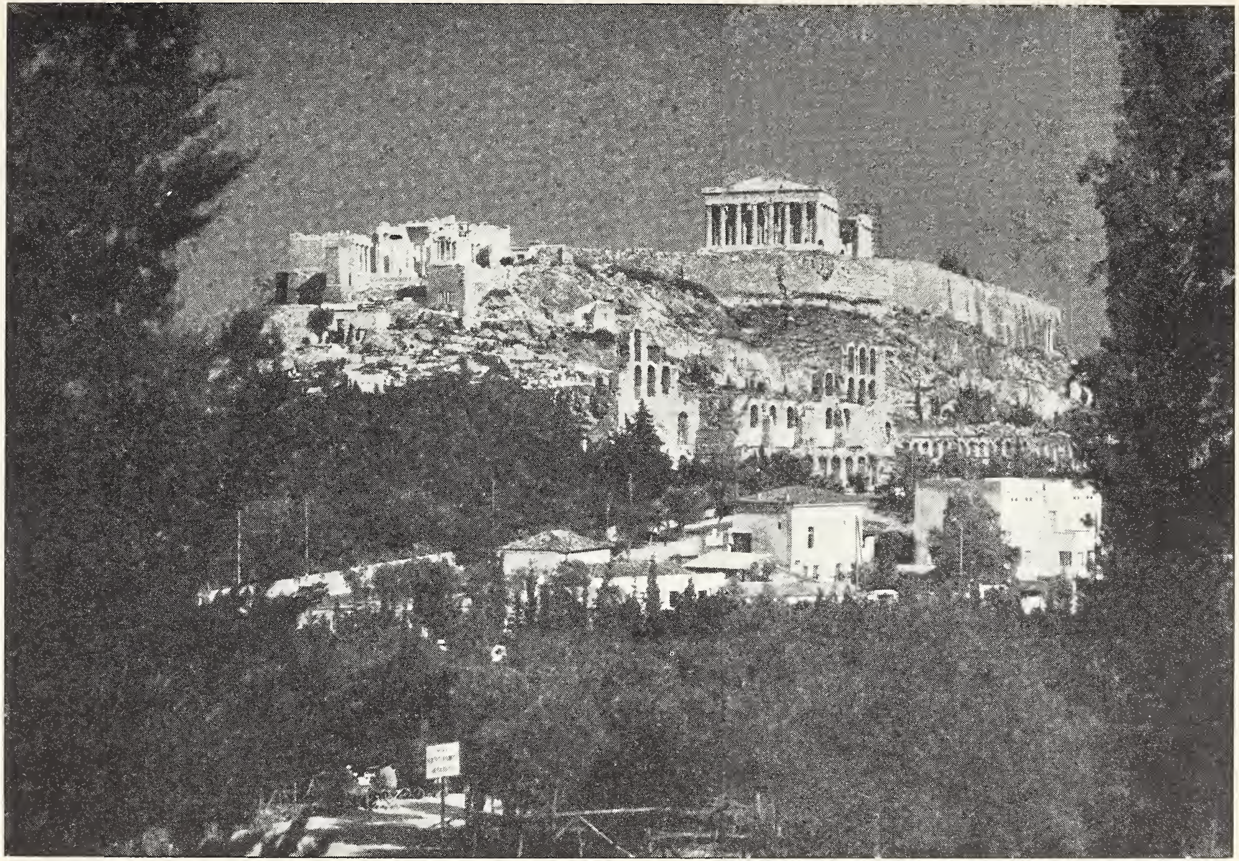
You are just beginning to wish that you could drop to earth and live out your life in Greece instead of America, when you happen to look around to see how the work is carried on. You find that it is being done by thousands of slaves, most of whom are fair-skinned; in fact, there seem to be many more slaves than there are other workers. So you decide to stay in the balloon for fear that the masters might chain you to a seat in one of their merchant ships or warships, along with the other galley slaves. You change your mind a little about Greece, and realize that perhaps there are some ways in which civilization today has advanced beyond that of 2500 years ago.

Your balloon drifts on westward over the Mediterranean, and you notice that the ships of the Greek traders go as far as Sicily. There too civilization is growing. And what is that going on in Italy? To the north, where Rome will later be, people are very active. They seem to be putting up buildings. There are some roads in that direction which look well-traveled. Who are those people moving along on one of them? Is it an army? Before you can make sure, you are carried southward.

There are some little trading villages on the north coast of Africa. And see beyond! Some ships have ventured into the Atlantic; they are sailing southward along the shore of the African continent.

The World about 1000 Years Ago

Presently the clock tells you it is the year 1000 A.D. Everything seems to be very peaceful and still. You wonder why, and, looking down, you find that you are so far away from the



Ewing Galloway

Fig. 15. What does the Acropolis at Athens tell you about the civilization of the Greeks?

earth that you can scarcely see what mankind is doing. As you descend you know that you are being carried over China, because far below you see the many green fields, the many temples and pagodas, of the Chinese. There seem to be millions of little dwellings with garden patches about them, thousands of boats moving lazily along the broad rivers. Everything seems beautiful and serene.

Before long the earth seems to rise toward you like a huge wave. It breaks in a whitecap of snow, and you realize that once more you are passing over the Himalayas. Then the land falls away and spreads out into the vast plains of India. Here, again, you see many Buddhist shrines. In the distance gleams a temple of white marble. Toward the southeast a new type of building comes into view. You polish up the lens of your telescope and look again. Yes, these new buildings are just like the pictures you have seen of Mohammedan mosques.

The farther west you go, the more mosques you see. Even Egypt has many of them. They rise here and there along the northern coast of Africa. What a wide area these temples include! The wind shifts northward before you reach the Atlantic, but in far-off Spain you can see one on the shore. In Sicily too there are some splendid ones, and on the island of Crete you can see the dome of a mosque towering above the buildings around it.

As you go northward you wonder what kind of temple you will find in the land of these northern barbarians. What you see first is not a temple at all, but a castle bristling with battlements. A great water-filled ditch has been dug around it to keep any unfriendly visitors at a distance. Many such castles can be seen across central Europe. They are very noticeable because so often they are built on hills high above the neighboring country. These people in Europe must still be

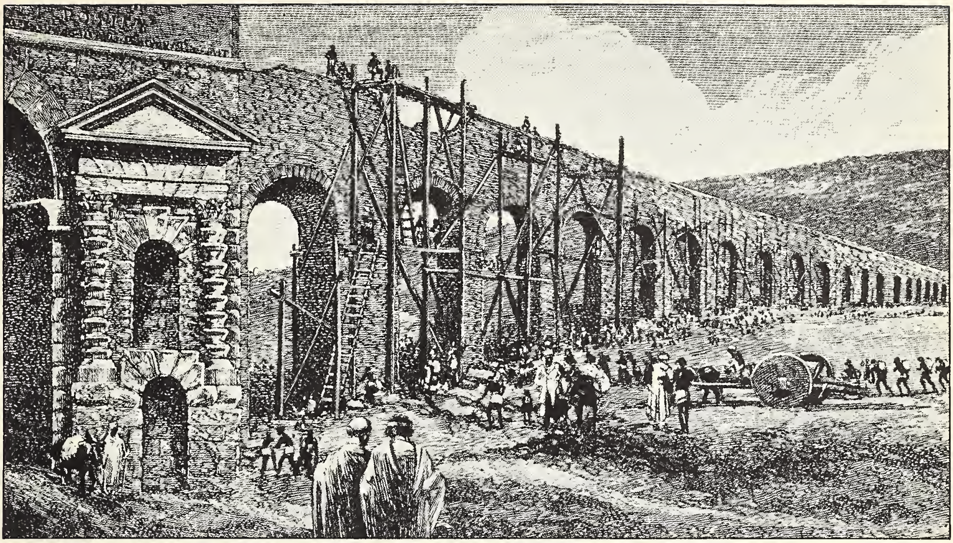
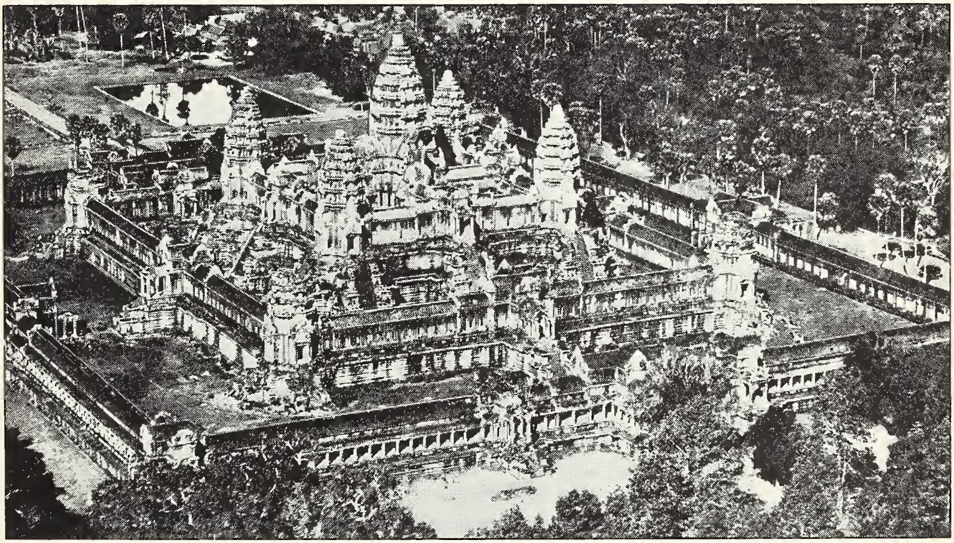


Fig. 16. The Romans built aqueducts of stone, using the idea of the arch, 2000 years ago. How were these examples of civilized ways of living?



Ewing Galloway

Fig. 17. In Indo-China this great temple, Angkor Wat, was built over 1000 years ago. What does it tell about the civilization in that country?

fighting most of the time. But they must have settled down too, or they could not put up such tremendous buildings of stone.

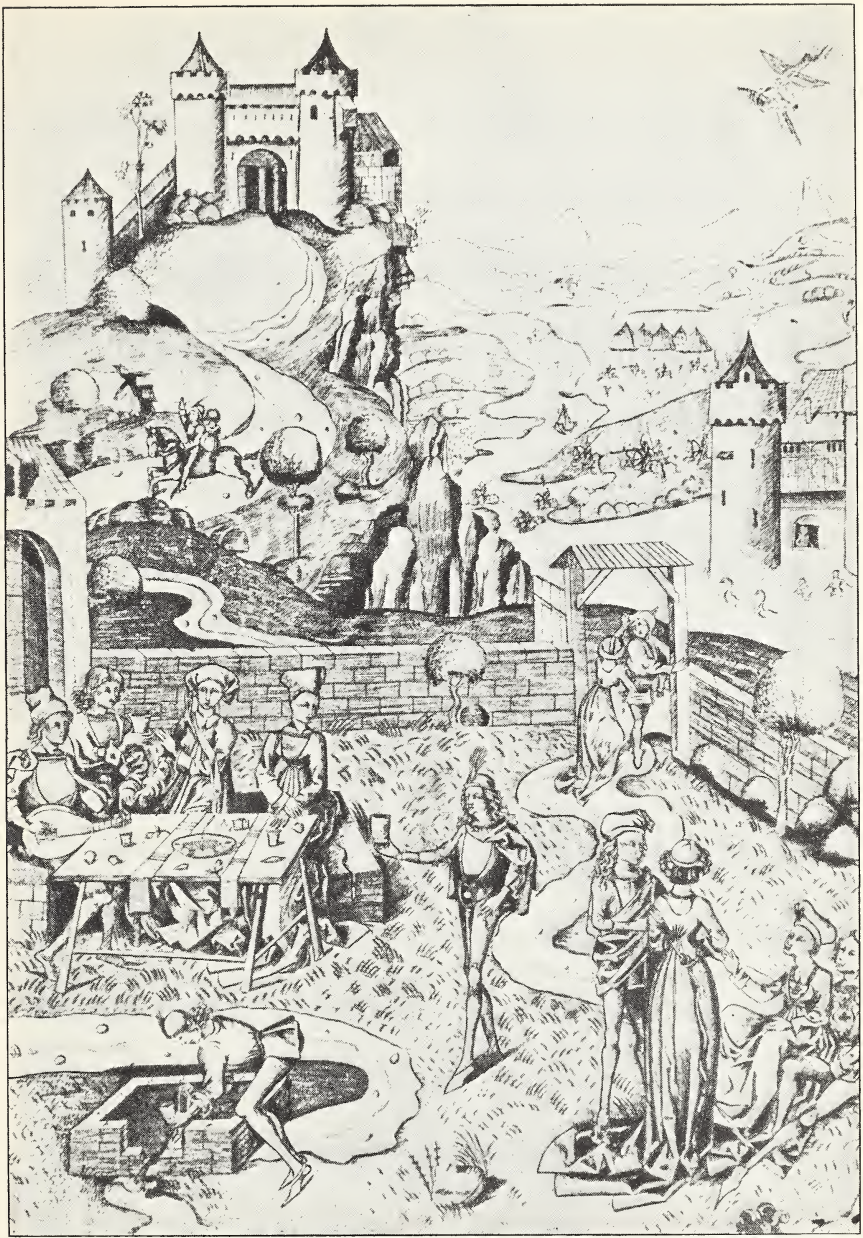
There are Christian temples here also, although not so many as there are Buddhist temples in the Far East or Mohammedan temples in the Near East and India.

You have not seen a single human being on this trip because your balloon has not once come near the earth. But it has been very interesting, because from the buildings you can guess what man is doing and how he is spreading his beliefs and his ideas of civilization. You mean to stay awake and see what is going on in America, but in spite of yourself you doze off to sleep.

What the World Was Like about 500 Years Ago

When you wake up, you are sure that you have missed a good deal. Your clock tells you that it is not quite 1500 A.D. You do not seem to be moving, and you are high above the Mediterranean. A slight breeze carries you this way and that; but you do not go far in any direction, and all the time you look down upon the beautiful blue of the ocean.

Never before has the water seemed so gay with life and activity. The ships with their many-colored banners look like floating circuses. Some of the big ones have all kinds of bright and curious pictures painted on their sails, reminding you of the painted canvas at a sideshow. It is a very jolly sight, and you are quietly enjoying it, when all at once it occurs to you that it must be about the date for Columbus to make his voyage to America. You take out your telescope and scan the Atlantic. It's lucky you thought of it when you did, because three small ships are just now disappearing in the west. If you had looked a little later, you would have missed seeing that famous trip.



Bettmann Archive

FIG. 18. Life in a castle garden of Europe during the Middle Ages. Which arts and crafts had been developed?

While you have your telescope out you glance at Italy. My! what beautiful cities! But how different are the buildings from those of ancient Rome! There are bell towers and cloisters, churches and villas. Italy is a flowering bush of cities. And how busy her trade is! Especially in Venice. Where in the world are all those ships going? Most of them seem to be traveling to the southeast, but some are sailing into the Atlantic and along the coast of Europe toward the North Sea.

After you have enjoyed watching the Mediterranean countries for about 30 years, a sudden wind catches your balloon and swirls it toward the Atlantic. You see some ships venturing southward along the coast of Africa. Before you can discover whose flag they fly you are blown away toward England. Your impression of France as you look back is that there are many more towns and villages than you saw on your last visit. There are more churches and monasteries; there are some very lovely mansions. There is much more shipping and commerce.

You have noticed British merchant ships and British men-of-war all the way from Egypt to the coast of France; but before you have a chance to see the British Isles, another change in the wind has carried you far out over the Atlantic.

The winds have been very uncertain on this trip. You have sailed and drifted and been blown here and there. Now, for a climax, comes a real tornado, which takes you rushing across the Atlantic toward Mexico and South America. You hope that you will get to Mexico in time to see something of the Aztecs, whom you have read so much about. But when you get there you see that the Spaniards have already destroyed that Indian civilization.

You are swept on over South America. In the mountains of Peru you behold sunken gardens and terraced hillsides. You catch a glimpse of a large city with paved streets, and palaces

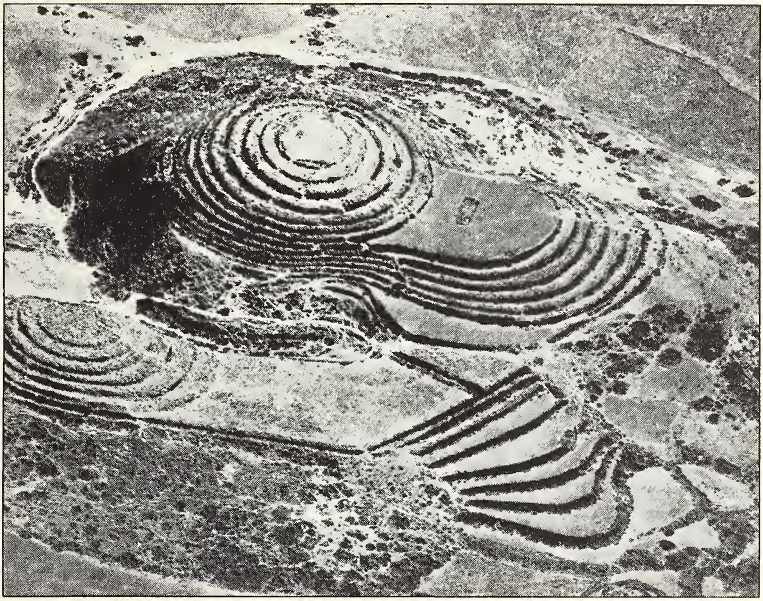


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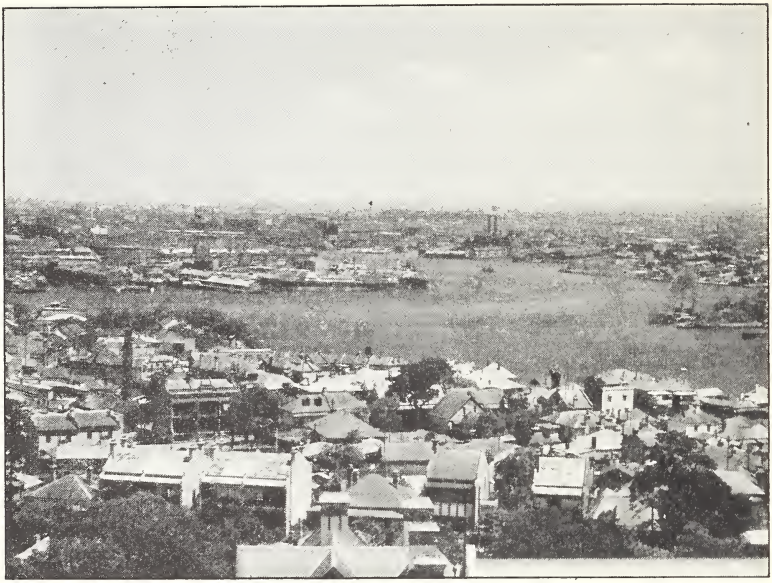
FIG. 19. In your travels you might have seen thousands of Incas gathered for a religious festival in these amphitheaters. They were built along the mountain slopes of Peru near the city of Cusco about 2000 years ago

and temples decorated with gold and silver. Before you can examine it closely, however, the city disappears behind a mountain top. At any rate, you have managed to see something of the civilization of the Incas before it was destroyed by the Spaniards.

You take a piece of paper out of your pocket and make a map of the world. Then, so you won't forget it later, you draw a little square in each place where you have noticed civilization beginning and spreading. The map looks somewhat like map 6, pages 108 and 109.



Ewing Galloway

Fig. 20. Sydney, Australia, a modern port city. What does the picture show about trade, community life, and architecture?

Your Last Trip round the World

You are only half awake, and you seem to be traveling terribly fast. You hear a humming sound. You must be in an airplane instead of a balloon! All the people of the earth seem to be rushing here and there. They seem to be trading with each other at a furious rate of speed. Sailing ships are no longer fast enough to carry their merchandise. Steamships even are not fast enough. There are railroads, motor trucks, automobiles, airplanes, zeppelins! The people seem to be mixed up too! There are Englishmen in China, and Chinese in England! Perhaps it only seems this way because you are still half asleep. But here is the United States. Why do so many people gather here? There are people from every part of the world. In fact, the mixture seems to be greatest here.

The burr of your airplane motor gets louder. You're falling! But it isn't the airplane that is burring; it's the alarm clock. You are in your own room in the twentieth century!

"That was some 'short cut' through history!" one boy exclaimed after he had read the story of the balloon trip. Perhaps you feel the same way about it — somewhat dazed at seeing the story of the earth and of man pass before you — 20,000,000 years in 25 pages!

Maybe you are thinking: "But was it accurate? Are these the facts that scientists give about it?"

Yes, that was an outline of the story as the scientists have pieced it together. It will be the task of the rest of our studies to fill in as many details as we can.

Books You Would Like To Read

DAKIN, W. S. Great Rivers of the World: A Story of Their Service to Man. The Macmillan Company, New York.

HAWKSWORTH, HALLAM. Strange Adventures of a Pebble. (Strange Adventures in Nature's Wonderlands.) Charles Scribner's Sons, New York.

HEAL, EDITH. How the World Began. Follett Publishing Company, Chicago.

HEAL, EDITH. How the World Is Changing. Follett Publishing Company.

HOUGH, WALTER. The Story of Fire. Doubleday, Doran & Company, Inc., Garden City, New York.

ILIN, M. Men and Mountains. J. B. Lippincott Company, Philadelphia.

MARTIN, EDWARD A. The Story of a Piece of Coal. D. Appleton-Century Company, Inc., New York.

REED, W. MAXWELL. The Earth for Sam. Harcourt, Brace and Company, Inc., New York.

WALKER, EDITH B., and MONK, CHARLES C. Tales of the First Animals. Farrar & Rinehart, Inc., New York.

WASHBURNE, CARLETON and HELUIZ, and REED, FREDERICK. The Story of Earth and Sky. D. Appleton-Century Company, Inc., New York.

CHAPTER III

Questions of Geography To Guide Our Study of Civilization

History and Geography Together

Did you notice that the story of the balloon trip was as much about the geography of the earth as it was about the history of man's life on the earth? Time after time we spoke of the lands and the seas, the mountains and the valleys, the fertile plains and the barren deserts, the winds and the temperature, ice and snow, rain and fog and blazing suns. We spoke about the grasses and other plants on which herds of cattle were grazing, about the stone and the timber and the clay bricks of which men had built their houses. We told of lands cleared of trees, of fields planted with grain, of irrigation on the banks of rivers, of boats and ships traveling the seas, and of many other similar things.

We found in our earlier studies that all these things deal with geography — with our earth and how men have been able to live on it. The study of how men have developed their ways of living through the ages is called history. So the story of the balloon trip, even though it gave us only a brief glimpse of life on the earth, was both geography and history.

We see, then, that to understand how 2,000,000,000 human beings can live on the earth today we must study man's life from ancient times to the present day. This is the story of civilizations. There have been many civilizations, and each one was formed in a definite region on the earth. Each one grew into what it was, and then into what it is today, partly because of the geography of the region. Our American civilization, for example, grew up in its own way partly because of the special kinds of climate, soil, vegetation, natural resources, coasts, rivers, harbors, and the like, that nature gave North America.

In the same way British civilization grew up in the British Isles. The climate and soil, the kinds of vegetation, natural resources, coasts, rivers, and harbors that nature put there had much to do with the way it developed.

The same thing can be said of every country and every people and therefore of every civilization on the earth today.

Do you begin to see, then, that to understand people and their ways of living we must study history and geography together?

That is what we shall do, then, in *Mankind Throughout the Ages*. For every part of the story we shall ask: "When did these things happen? Who did them? How did they happen?" This is history. But we shall also ask: "Why did these things happen where they did? Did nature decide ways of living?" That is geography.

The story of the balloon trip in Chapter II was really a quick review of the geography of the earth and of the long history of the people on it.

In this chapter we shall begin by gathering together the chief facts that we have already learned about the earth and man's life upon it so that we can use them again in our studies.

The Earth and Man

You remember from *The First Book of the Earth* that

Our earth is a great round ball, but a mere speck in the universe.

This earth and the other planets were born out of the sun and make up the solar system. We have learned these things about the universe because we know how to use telescopes and other instruments.

The earth spins and moves, giving us night and day and the seasons of the year.

The earth cooled; water and mountains came upon it and air surrounded it.

The higher lands formed continents and smaller islands. The water filled the low places to form oceans and seas and bays.

The earth got its skin of soil, and then it was ready for life.

Living things grew on the earth — 200,000 different kinds of plants and 815,000 kinds of animals.

At last men came upon the earth.

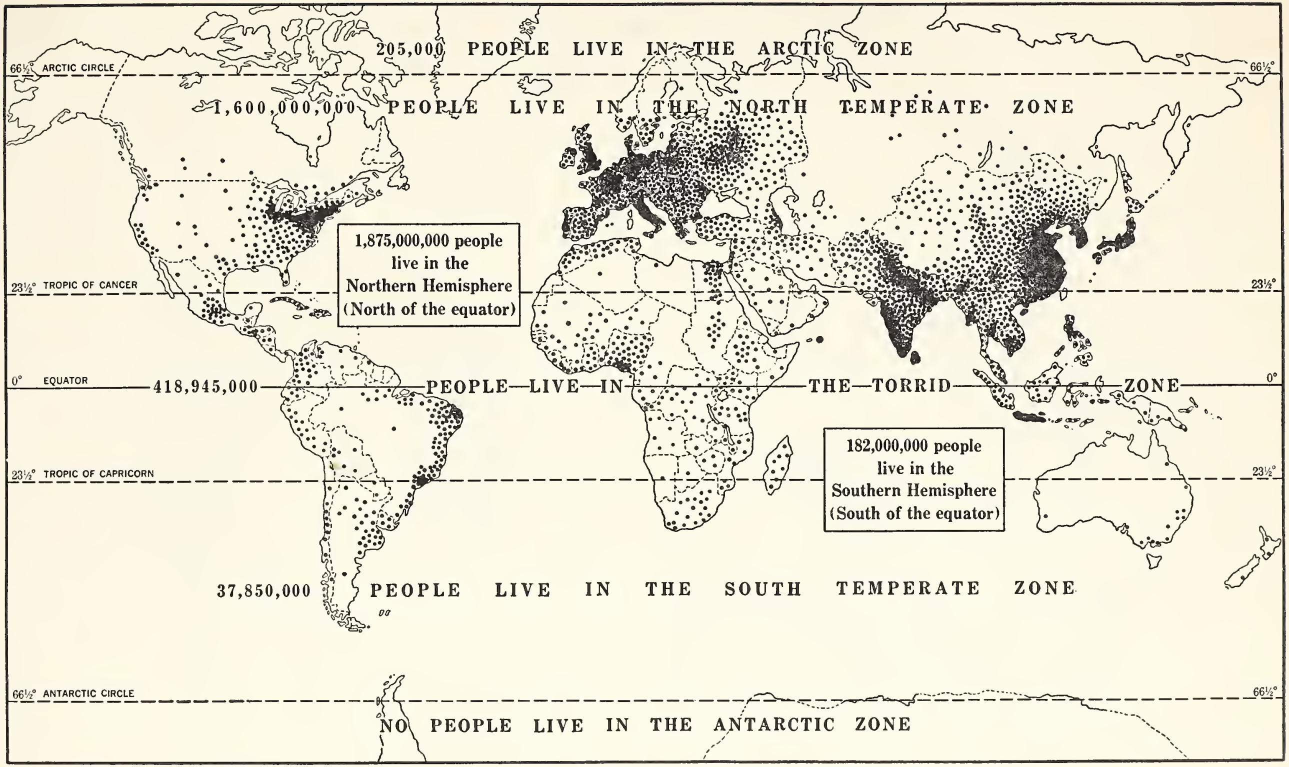
Thus we begin with the story of how our earth spun and moved in the universe for a billion years and more until all was ready for life, and human life came upon it.

The Location of Things on the Earth

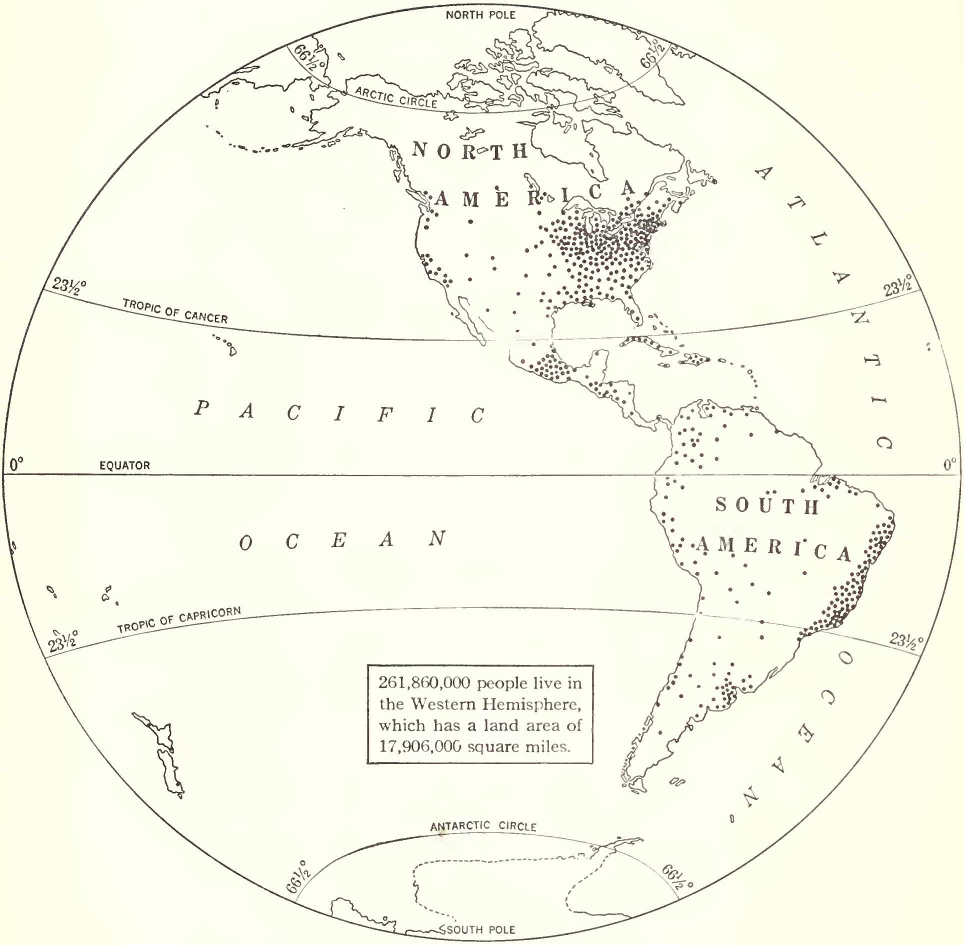
No doubt you do not need to be reminded that the earth is divided in many ways: into hemispheres and zones, into islands and continents, into oceans and seas and the like. We've studied these divisions time after time. But let us sum them up here, just to make sure.

The Hemispheres

As you study such maps as 1, 2, and 3 try to see the lands of the earth divided into two kinds of hemispheres (*hemi* means "half," and *sphere* means "ball" or "globe").

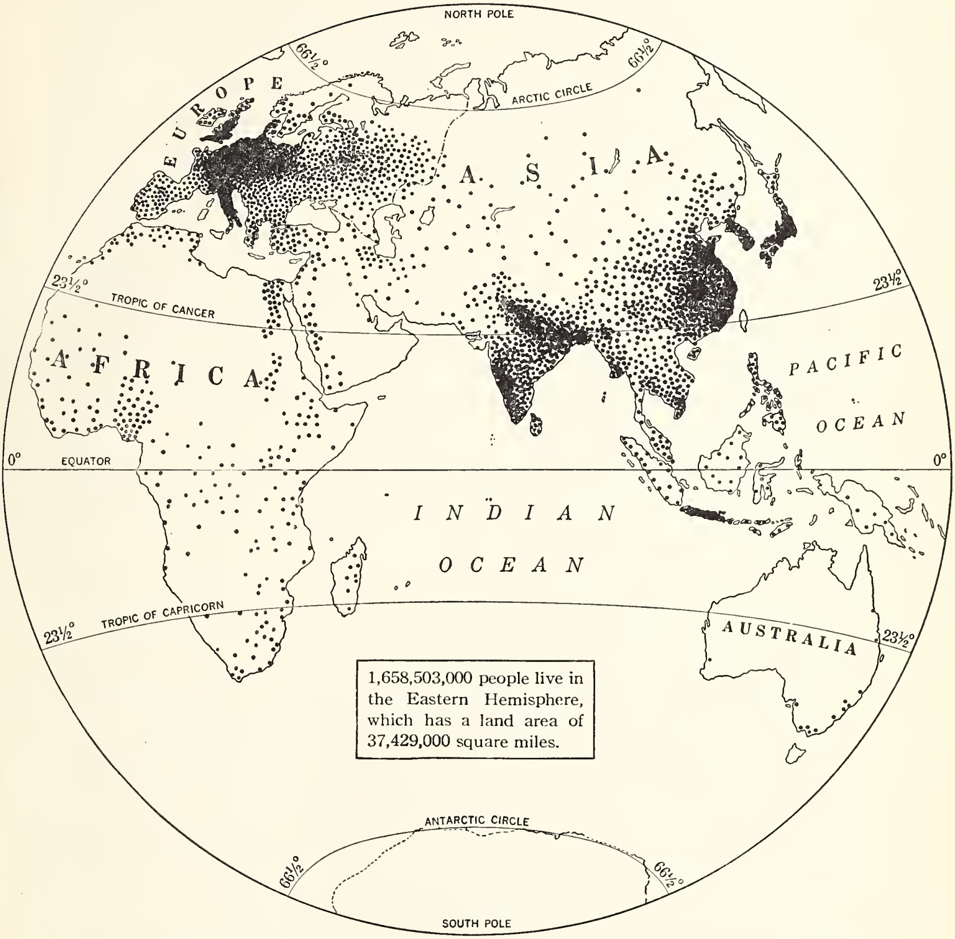

205,000 PEOPLE LIVE IN THE ARCTIC ZONE
66½° ARCTIC CIRCLE
66½°
1,600,000,000 PEOPLE LIVE IN THE NORTH TEMPERATE ZONE
1,875,000,000 people live in the Northern Hemisphere (North of the equator)
23½° TROPIC OF CANCER
23½°
0° EQUATOR
418,945,000 PEOPLE LIVE IN THE TORRID ZONE
0°
182,000,000 people live in the Southern Hemisphere (South of the equator)
23½° TROPIC OF CAPRICORN
23½°
37,850,000 PEOPLE LIVE IN THE SOUTH TEMPERATE ZONE
66½° ANTARCTIC CIRCLE
66½°
NO PEOPLE LIVE IN THE ANTARCTIC ZONE

MAP 1. How the population of the earth is distributed in the Northern and Southern Hemispheres. Each dot represents 500,000 people



261,860,000 people live in the Western Hemisphere, which has a land area of 17,906,000 square miles.

Map 2. The distribution of population in the Western Hemisphere. Each dot represents 500,000 people



Map 3. The distribution of population on the Eastern Hemisphere. Each dot represents 500,000 people

First, the equator is an imaginary line that cuts the earth into halves. The part north of the equator is called the Northern Hemisphere. The part south of it is called the Southern Hemisphere.

Remember that all places north of the equator are located definitely by stating the number of degrees north latitude. The equator is 0° latitude. All places in the Southern Hemisphere are located definitely by stating the number of degrees south latitude.

Second, places must also be located east and west of some line. For this other imaginary lines, called meridians, are drawn running north and south through the poles. The 0° line is drawn through Greenwich, a suburb of London, England. The 180° line runs through the Pacific Ocean, passing between the islands of Fiji and Samoa.

All places between 0° and 180° west of Greenwich are in west longitude. All places between 0° and 180° east of Greenwich are in east longitude.

The Continents, Oceans, and Seas

Next make sure that you know where all the principal lands and waters of the earth are located. Perhaps the best way is to remember the continents and the oceans and principal seas and gulfs together. For example, remember that the Atlantic Ocean separates Europe and Africa from North and South America; that the Pacific separates North and South America from Asia and Australia and certain important islands.

Remember that the Mediterranean Sea separates Europe and Africa. Also that it was called the "middle of the earth" for a long time, as the word *Mediterranean* actually means that.

In the same way review the location of all the other principal waters, including the seas and the gulfs and the larger bays.

See in Your Mind's Eye Where the People of the Earth Live

As you begin the study of ancient civilizations remember that today there are, in round numbers, 2,000,000,000 (two billion) human beings living on the earth. Two billion! Two thousand million! A million people gathered together would make a very large city, would it not? There are, in fact, only five cities in our country with a million people. Yet on the earth today there are two thousand millions of people!

Ask yourself: "Who are these two thousand million people? Where are they living?"

Study maps 1, 2, and 3 to note the general location of the inhabitants of the earth. Ask yourself: "Are most of them in the Northern Hemisphere? the Southern Hemisphere? Or are they in the Eastern Hemisphere? the Western Hemisphere?"

Then ask, "In which continents do most of them seem to be living now?

The Principal Countries of the World Today

Speaking of people and where they live, you remember, no doubt, that there are 74 countries on the earth. See if you can tell, from your study of *Peoples and Countries* and *The Building of America* and from maps 2 and 3, which ones have the largest numbers of people. List the ten largest countries in the world. In which hemispheres are they? In which continents are they?

What Is Meant by Climate?

Do you remember what we mean by climate?

1. *Rainfall* — the amount of rain in each year and the seasons in in which it falls.

2. *Temperature* — how high it goes; how low it goes; how it affects the energy of the people.
3. *Winds* — over what kind of land or water the winds blow. If they blow for thousands of miles over a vast dry continent like northern Asia, they will have little moisture in them. If, on the other hand, they blow from warm oceans or seas like the Red Sea or the Indian Ocean, they will be wet and warm, bringing rainfall and warmth to the land. Moreover, if they blow over high mountains, they will tend to leave most of their moisture on the side they strike first.

Remember also to ask: "Are there special currents of water such as the Gulf Stream, the Humboldt Current, the Japan Current, which affect winds and climate?"

The Chief Climate Zones

It is helpful to remember that climate depends somewhat upon the zones of the earth. Recall again the location of the five chief zones. The Antarctic and Arctic circles, the Tropic of Cancer, and the Tropic of Capricorn make them stand out clearly on maps 4 and 5.

1. The Arctic zone, from the north pole to $66\frac{1}{2}°$ north latitude.
2. The north temperate zone, from $66\frac{1}{2}°$ north latitude to $23\frac{1}{2}°$ north latitude.
3. The torrid zone, from $23\frac{1}{2}°$ north latitude to $23\frac{1}{2}°$ south latitude.
4. The south temperate zone, from $23\frac{1}{2}°$ south latitude to $66\frac{1}{2}°$ south latitude.
5. The Antarctic zone, from $66\frac{1}{2}°$ south latitude to the south pole.

In Which Climatic Zones Do People Live?

After you have refreshed your memory about the zones, study the population maps 1, 2, and 3 once more. Are there people in the Arctic and Antarctic zones, the so-called frigid zones? Are there many? Why or why not? What is there about those zones that leads people to settle there or to stay away?

Are there people in the torrid zone, between 23½° north latitude and 23½° south latitude? Are there more or less than in the frigid zones?

Are there many people in the north temperate zone? in the south temperate zone? Can you give one reason why there are many more people in one of the five zones than there are in any of the other four? Turn back to map 1, on page 49. That will tell you how many people there are in each zone.

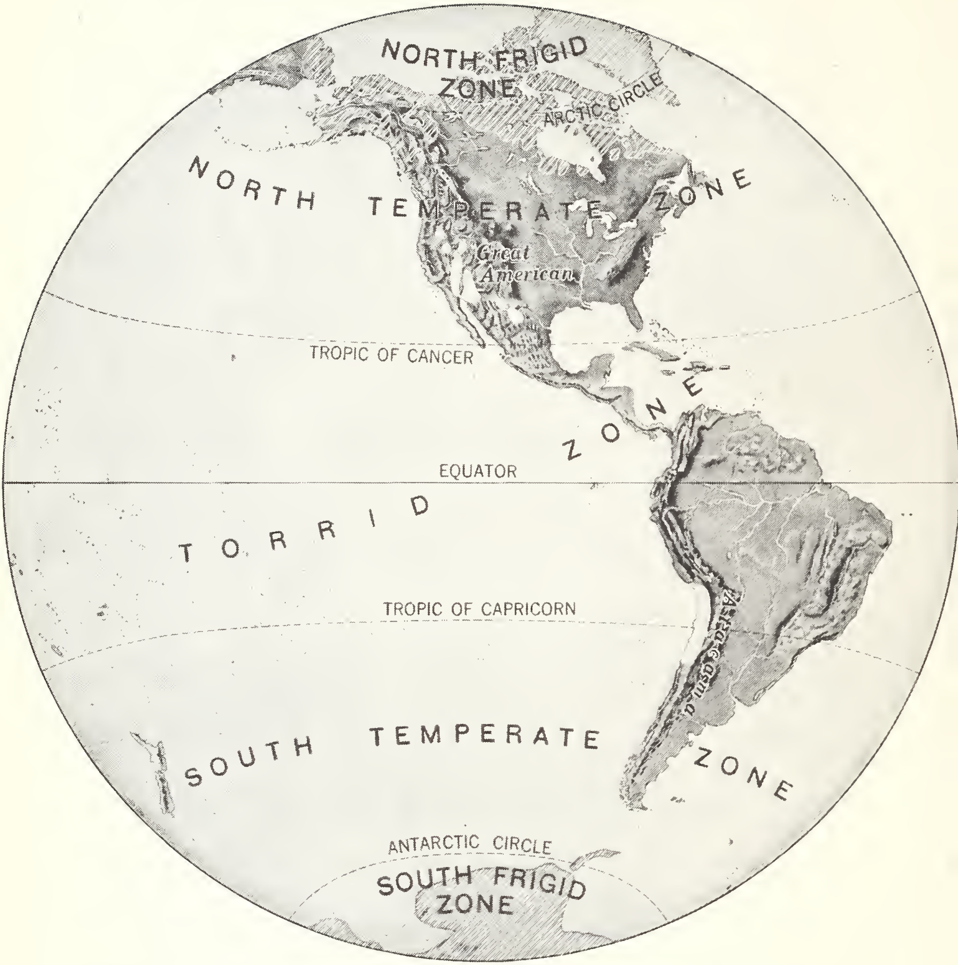
The Mountains and the Plains

We have learned in our earlier studies that the lay of the land has a great deal to do with where people live. Study the maps following pages 124, 173, 191, and 473 to see if you can name the chief mountain systems of the earth. Can you find the mountain backbone of the Americas which extends all the way from Alaska to Cape Horn? What are the big mountain systems called? How high are they? Are they young mountains or old ones? What are the differences between them?

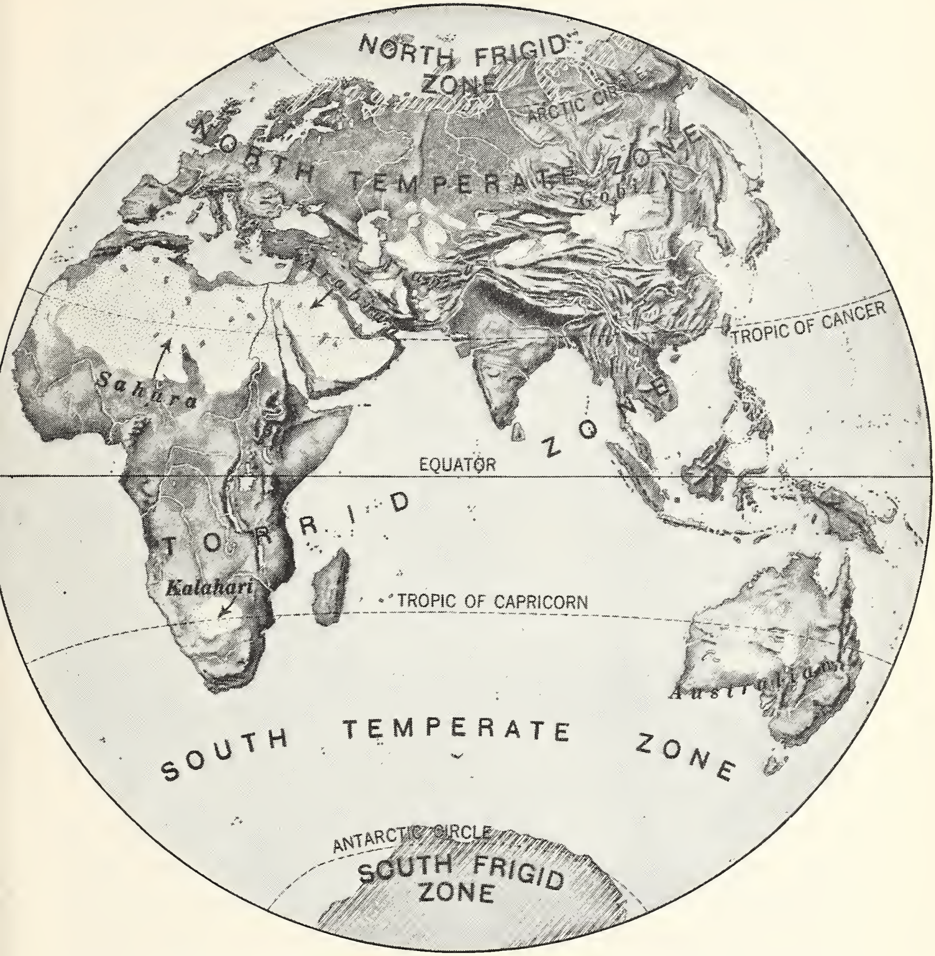
What are the chief mountains in Europe? What countries do they separate? In what directions do they run? How high are they? How do they affect the winds that blow over Europe and the rain that falls upon it?

What are the principal ranges of Asia? How high are they? In which direction do they run? How do they affect the winds and rainfall in China and India? Do mountains ever separate the people of certain regions from those of other regions?

Now do the same thing for the great level plains. Find the Mississippi Valley plain of the United States and the extension of it into Canada.



Map 4. The lands marked with straight lines across them are the great ice deserts. Find two other deserts on this map. They are the driest parts of North and South America



Map 5. The white lands with dots on them are the great sand deserts. Notice the oases in the Sahara and Arabian deserts. Find the ice deserts on this map

Find the enormous plain that stretches across central and northern Europe. Are there many people living there?

Find the chief plains of Asia, Africa, and Australia. Are there many people in them? Why?

Now compare the maps which show the mountains and plains with the population maps 2 and 3. Do most people live in the mountain regions or in the great plains? Why? What have mountains to do with where people live? What have level plains to do with it?

The Deserts of the Earth Where Vegetation Is Sparse

In order to understand how civilizations grew at certain places and not at others, we should have a clear picture of the deserts of the earth. Remember that there are hot deserts, like the Sahara or Kalahari of Africa, and cold deserts, like those of the frigid zones.

Think of the Sahara and Arabian deserts (map 5), the largest and driest in the world. They stretch across all of northern Africa and most of the vast Arabian peninsula for 3500 miles east and west and 1500 miles north and south. As far as one's eyes can reach, there is rolling sand and stony plateau. Only here and there are seen a few scrubby bushes and palm trees. Only at great distances apart can water holes and oases be found.

Notice, too, their location between 15° and 30° north latitude. "Ah, they are in the tropics, and the temperature stands high!" you exclaim. Yes, indeed. The Tropic of Cancer ($23\frac{1}{2}$° north latitude) runs through the middle of the desert land for 3500 miles, from western Africa to eastern Arabia on the Gulf of Persia. In the summer the thermometer rises to 120° and more in the daytime. In the winter in some places it drops to freezing (32°).

Most of the Sahara is sandy or rocky tableland from 1000 to 2000 feet high. Although it is fairly low — only about 600 feet above sea level in western Africa — it rises to above 3000 feet in the central part. In one small spot — the Tibesti Mountains — the land rises to a height of 11,000 feet!

This is desert indeed! In a whole year most of this region gets less than five inches of rainfall. In such a land, of course, almost no grass or bushes or trees can grow. Compare this with the 100 to 200 inches in the tropics, or with the 20 to 40 inches in most of Europe and the United States.

And are there people in this vast region? Think of the Sahara, which has 3,000,000 square miles and is as large as all Europe or the United States. Although no exact count of the people living in the Sahara has ever been made, or probably could be made, students of population feel sure that the entire land has fewer than 1,000,000 people. The United States has nearly 130,000,000 human beings.

The Arabian Desert is as large in area as the eastern half of the United States and has less than 2,000,000 people altogether. And in southern Arabia, 300,000 square miles in area, it is believed that there are almost no people at all.

Find the other deserts of the world — the Australian desert, the Great American Desert, and others. Can you find any in Europe?

These are all "hot" deserts! Can you find any "cold" deserts on the earth?

Compare the desert maps 4 and 5 with the population maps. Do you agree now with this statement: "Few people live in the deserts"?

Gifts of Nature To Help People To Live on the Earth

But we must look for other things as we study how men invented civilized ways of living; that is, the things that nature gave them to help them live. One of these is the wonderful "vegetation" — the plants and trees — on the earth.

You know, of course, how important the forests are to man. Can you name the principal ways he uses them? How does he use them in building his houses? in making his furniture, his implements and tools, his paper? Can you name other ways?

Are there other ways in which the forests help man? Do they affect the floods of the rivers in spring? the washing away of the topsoil of hillsides? How?

Where are the principal forests of the earth today?

What about grass and other plants? Scientists tell us that there are 4700 different kinds of grasses on the earth. 4700! Meadow grass, alfalfa, sugar cane, barley, wheat, oats, corn, rice — these are a few well-known ones. At one time all these grew wild. Later on man learned how to plant some of them and raise crops. They are so important to him now that his life really depends upon them. We shall wish to study much more about this.

Coal and Oil and Metals

In an industrial country like ours people depend on other gifts of nature found in the earth. The principal fuels that run our engines are coal and oil. The principal metals out of which we build our tools, implements, engines, and machines are iron, aluminum, manganese, copper, tin, and others mixed together to give us fine alloys like steel.

Our very lives today depend on having supplies of these

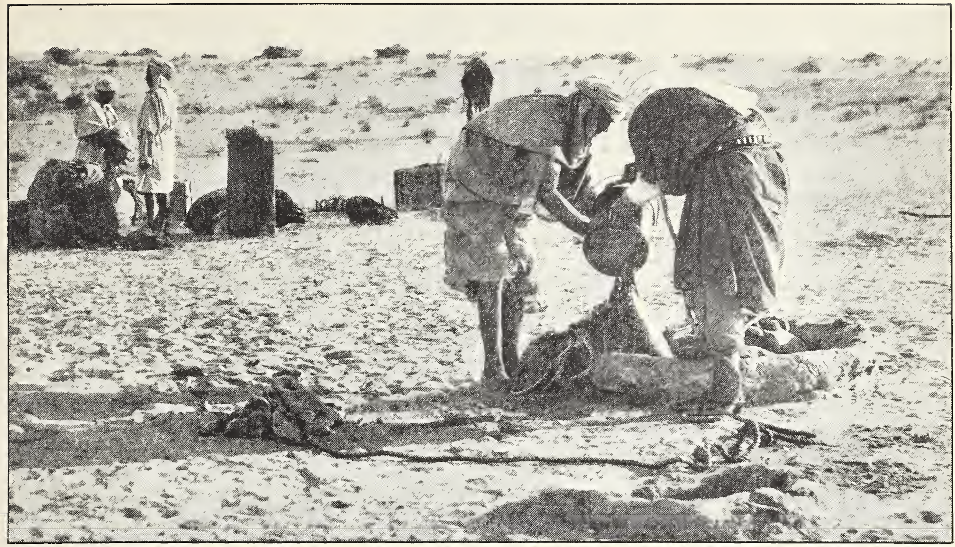
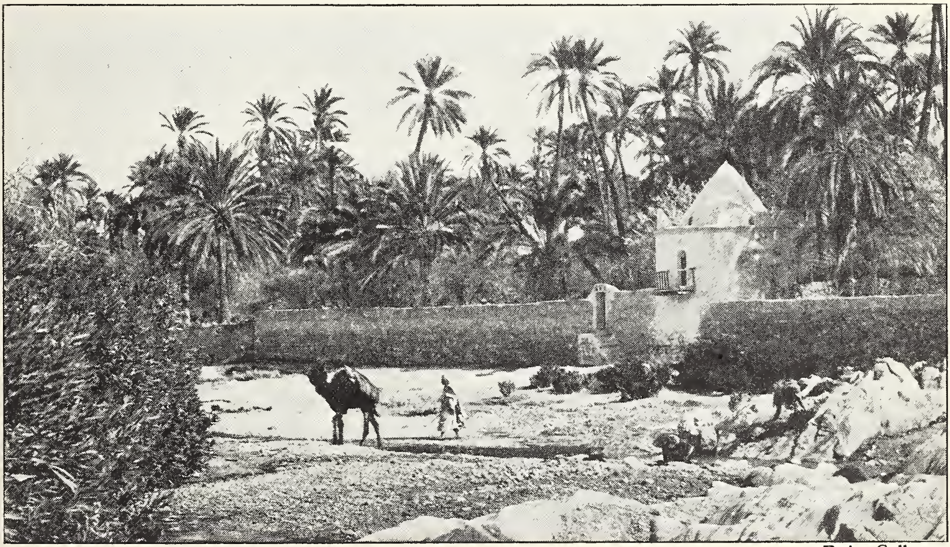


Fig. 21. Travelers in the Sahara Desert getting water from a well that is fed by an underground stream. What does this show about climate and vegetation?



Ewing Galloway

Fig. 22. An oasis in Algeria also tells you of vegetation in the desert. What kind of climate is found in this part of the earth?

fuels and metals. As we study how man built our new civilization, then, we shall be on the lookout to find out where the great deposits of coal and oil, iron and other similar materials, are found. Maps 21, 22, and 23 (pages 469, 471, and 472) show where they are. We shall refer to these frequently.

All These Gifts of Nature Are Called "Natural Resources"

This concludes our brief introduction to *Mankind Throughout the Ages*. It is with questions like these to guide us that we shall make our study.

Books You Would Like To Read

Dorrance, J. G. Story of the Forest. American Book Co., New York.

Du Chaillu, P. B. Lost in the Jungle. Harper & Brothers, New York.

Duval, E. W. This Earth We Live On. Frederick A. Stokes Company, New York.

Fabre, J. H. Field, Forest and Farm. D. Appleton-Century Company, Inc., New York.

Fraser, Charles. Secrets of the Earth. Thomas Y. Crowell Company, New York.

Hillyer, V. M. A Child's Geography of the World. D. Appleton-Century Company, Inc., New York.

Humphreys, W. J. and Talmon, C. F. Weather. Boy Scouts of America.

Martin, E. C. Our Own Weather. Harper & Brothers, New York.

Quinn, Vernon. Picture Map Geography of the World. Frederick A. Stokes Company, New York.

Rogers, J. E. Earth and Sky Every Child Should Know. Grosset & Dunlap, New York.

Sharp, D. L. Fall of the Year. Houghton Mifflin Company, Boston.

Sharp, D. L. Spring of the Year. Houghton Mifflin Company, Boston.

Sharp, D. L. Summer. Houghton Mifflin Company, Boston.

Sharp, D. L. Winter. Houghton Mifflin Company, Boston.

Thompson, J. M. Water Wonders Every Child Should Know. Grosset & Dunlap, New York.

PART II

Before History Began

PERHAPS the mind magic of our balloon trip made you think of many questions that you would like to ask. Are you wondering how it all started and what the earliest men were like? Would you like to know how it happened that the Chinese and Egyptians, the Assyrians and Babylonians, were building the temples and tombs at the very moment that our ancestors in Europe were still uncivilized barbarians? Are you asking such other questions as these: Why are the people of eastern Asia slant-eyed and yellow-skinned? Why do those of Africa have black skins and kinky hair? Why are the European people lighter-skinned and lighter-haired?

If you are, you are in good company; for scientists in many lands have been looking for the answers to such questions. Already some are partly answered; about others they are still in the dark. But they work on patiently, continuing to search for more and more knowledge about ancient times and ancient man. A little of what they have already found out we shall tell you.

But remember this: Many of the scientists themselves do not always agree, and the conclusions given in this book are not necessarily final. No doubt, when we know more, the story will be somewhat different. But the main outline, the scientists think, is beginning to grow clear.

To understand the whole story of man on earth, we have to know something of his life before written history began. "Why *written* history?" you ask. "Do you mean to say that there are other kinds of history?"

Yes, several kinds of history are included in the story of mankind. Whenever you say "history," no doubt you have in mind written history. You probably think of the history that is described in printed books, or carved on stone monuments, or engraved on copper or silver plates, and the like. But this "written history" goes back only about 6000 years, whereas the whole story of mankind goes back hundreds of thousands of years, possibly millions. It covers a stretch of time so great that you and I, who have lived only a few years, can hardly imagine it.

How, then, have the scientists been able to piece the story together? In a truly remarkable way, slowly and patiently. In the next chapter we shall see how they have worked and what they have found.

CHAPTER IV

Our Earliest Glimpses of Man in the Old Stone Age

How the Java Man Was Found

In the year 1891 A.D. a Dutch army surgeon by the name of Eugene Dubois was engaged in a strange occupation on the island of Java. With a group of native workers he was busily digging in the ground not far from an unimportant little river. Why should a European doctor be using so much energy in this tropical climate? What could he be looking for?

Dr. Dubois was digging for bones! "And why was he doing that?" you ask. He was in Java because he was interested in the early history of living creatures. He knew that on this island there were important relics of the animal life of the past, and he hoped that he might find relics of man's ancestors among them. So day by day he searched.

People who dig in the earth with such hopes are not often so well rewarded as was Dr. Dubois. To his great delight he found some human bones — a part of a skull, a leg bone, a nose bone, and three molar teeth. Perhaps the discovery of a few bones and some teeth does not seem important to you, but to Dr. Dubois it was a rare find.

In the first place, it seemed certain that the bones were very, very old. Not 100 years, not 1000 years, not even 10,000 years — but much older! "As much as 100,000?" you ask. Yes, probably even much older than that! Probably closer to 1,000,000 years!

In the second place, all the bones were found in one spot and would seem to have belonged to one individual — a female perhaps five feet six inches tall. Unlike apes, that walk on all four feet, this creature stood upright on two feet. No doubt it walked as erect as we do today, for its thigh bone was remarkably straight. Its brain was rather large; in fact, more than one third again as large as that of any living ape. Scientists believe now that this creature might even have been able to speak. It probably could not use words, as we do today, but could perhaps only make noises which to us would sound like grunts and snorts and howls.

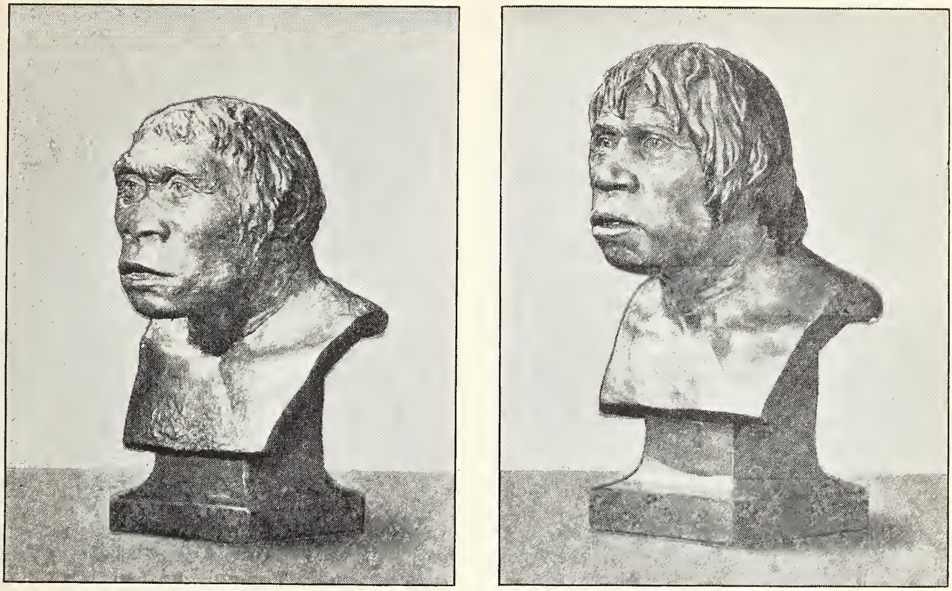
Can you imagine how this creature acted when a terrible enemy came upon it? Perhaps while it stood eating wild fruits which it had pulled from a tree, a lion or a tiger or a mammoth or a rhinoceros or a hippopotamus appeared. Can you see it pulling itself up to its full height and showing its huge sharp teeth, or shouting at the animal to go away? Perhaps it even threw sticks and stones at its fierce enemy.

Scientists have given to this ancient creature a long name, but we will call it "Java man." If you will look at figure 23, *a*, you will see how the scientists and artists think it may have looked.

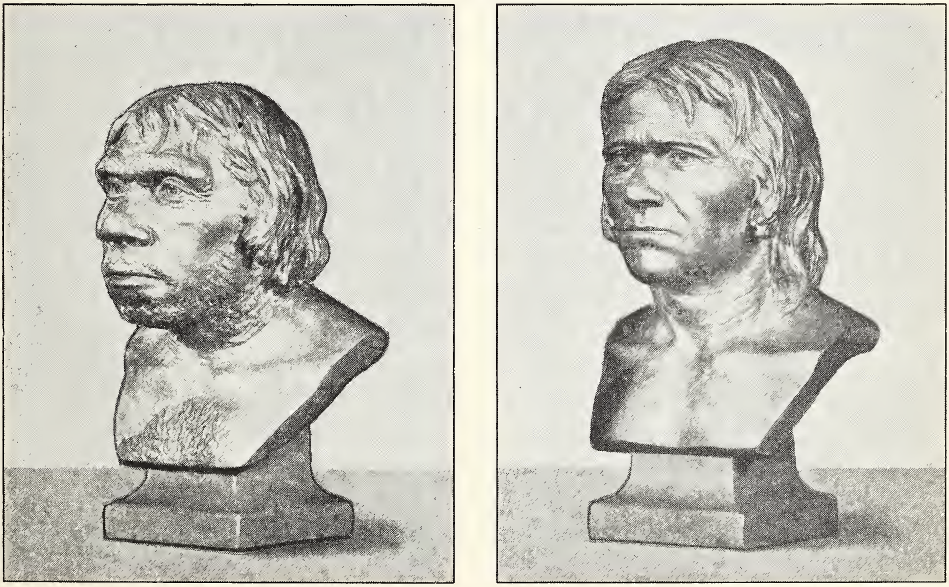
What "Java Man" Means to Us

"This is all very interesting," you may say; "but what does this strange creature with the long name have to do with the history of man?"

Just this. It is believed to be one of the earliest types of human being. It was not an actual ancestor of modern men because it seems to have died without leaving any descendants. But it was a distant relative of our ancestors.



a. Java man *b. Piltdown man*



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c. Neanderthal man *d. Cro-Magnon man*

FIG. 23. Artists have reconstructed these early men, showing us how they might have looked

"Peking Man," a Second Ancient Man, Found in China

Remains of creatures somewhat like the Java man have been found in other parts of the earth. A few years ago a collection of interesting bones was dug from a cave near the city of Peiping (formerly called Peking), in China. After scientists had carefully studied them, they decided that the remains belonged to another very early "man." Professor Davidson Black named him the "Peking man." Scientists from all over the world have been going to the Peiping Union Medical College to study the two skulls, the two broken jaws, and the several teeth of the Peking man. The authors of this book saw them when they were there in 1932. Most students believe that the skulls belonged to a more human kind of early man than the Java man, one who lived somewhat later than the time when the Java man was running through the jungles of his island. Many students believe that the Peking man was truly one of our ancestors.

The Piltdown Bones, Remains of the Earliest Known Englishman

Twenty-odd years ago some workmen discovered the bones of a skull in a pit near Piltdown in Sussex County, England. With it were found the teeth of a rhinoceros and a hippopotamus and a deer's leg bone. After long, long study and argument scientists now think that these skull bones may have belonged to a man who lived some time between the earliest human being and the human beings of today.

At what time did this man or woman live? Scientists are pretty well agreed that the Piltdown man lived later, but not very much later, than the Java and Peking men. Perhaps 600,000 years ago. This man certainly did not look very modern (figure 23, *b*)! His forehead sloped back sharply and so did his chin. Nevertheless, his brain was larger and more like a modern brain than was that of the Java man or Peking man. He could make tools of stone and bone and could light a fire. Perhaps he could talk a little.

So from the bones of Piltdown man we get a little more of the story to add to that told by the bones of Java man and Peking man.

When did these early men live? Perhaps as much as 1,000,000 years ago! Dates are uncertain when we are speaking of happenings so long past. The scientists can make only rough guesses about them. They feel safe in believing, however, that the Java man, the Peking man, and the Piltdown man certainly lived not less than 500,000 years ago.

Now let us try to imagine "ages" — hundreds of thousands of years — slowly passing. A hundred thousand . . . two hundred thousand . . . more perhaps . . . and then we come to

Heidelberg Man, the Earliest Known German

As recently as 1907 a jawbone was found at Heidelberg, a town in Germany. It was an especially interesting jawbone because none of the teeth had fallen out of it. We do not suppose that this Heidelberg man, as the man who once used the jawbone is called, was the earliest German. But he is the first one who has supplied us with anything to prove he once lived. The jawbone is massive and powerful, much more so than that of man today. There was almost no chin. What there was, was so narrow that the man could not have moved his tongue easily to form words, although there is no doubt that he could make a few sounds. Nevertheless this jaw belonged to a man; the teeth are human teeth.

When did he live, this Heidelberg man? Many scientists think it was about 300,000 years ago. It was about that time, they think, that some early "man" had such a jaw and teeth to tear and chew raw meat for his dinner. Was it much longer ago? We cannot be sure.

Neanderthal Man, the Cave Man of the Movies

We have no record of man's history for many thousands of years after the passing of Heidelberg man. Who lived on the earth during that time, what kinds of animals, what kind of "men" or "near men," we do not know. Thus far no bones or tools or weapons have been dug up to help fill in this gap.

But more bones were to be discovered in still later deposits. Here was a creature that seems more like men of today than the Java man or the Peking man or the Piltdown man. He was much more like men of today, and yet not really the same.

The first discovery of these bones (a skull and some other parts) was made in 1857. It was made in a cave in the Neander valley in Germany. For that reason the type of man to whom they belonged is called "Neanderthal man" (*thal* in German means "valley"). Since that date the complete skeletons of very similar men have been found in Spain, in Belgium, in Yugoslavia, and in Palestine. Scientists now believe that such men lived scattered all over Europe from about 150,000 B.C. to about 25,000 B.C. Scientists believe that they looked like the man shown in figure 23, *c*.

According to our ideas of beauty Neanderthal man was not handsome. His heavy, powerful body was hairy. His legs were bent outward below the knees, so that he could not walk quite upright. His head and neck were not held straight up from his shoulders, but were constantly bent forward. His forehead slanted back from heavy ridges above his eyes. These were probably covered with thick and bushy eyebrows. His nose was broad, with wide nostrils. His jaw was heavy and his chin slanted inward. But his brain was larger than that of the other men we have already seen. He was more clever. He could talk better. He was more like modern man.

Like the earlier peoples, this man was a wanderer over the earth. He did not raise his food; he hunted it: birds' eggs, berries and other wild fruit, fish and animals. Did he have weapons and tools? Probably wooden spears and axes, crude and dull. With these he caught fish from streams and beat small animals until they died, ripped off the skins, and chopped off the meat.

Did he have a house? Perhaps just a squatting place around a little fire which he had learned to make. In some regions a cave, with the fire built at the entrance, may have served as a house. Figures 11 and 34 show how the artists of our museums think the families of men like Neanderthal man may have looked.

Here, then, are stories of five kinds of early "men": Java man . . . Peking man . . . Piltdown man . . . Heidelberg man . . . Neanderthal man. In each case bones dug out of the earth in different parts of the world have been fitted together to make a man.

Perhaps you are thinking, "It's not much from which to write the history of the beginnings of human life on the earth."

That is true. Five small collections of bones do not seem to be very much. And yet with them the scientists have been able to put the story together. They do not always agree among themselves about everything, but their studies show enough agreement so that we can begin to get clear ideas about the earth and how man and the other living things developed upon it.

The stories of these little piles of bones teach us something of how scientists study the earth and the life upon it. Let us pause for a moment to see who these scientists are and how they work.

First: The Story of the Rocks [1]

For the special studies of the earth and how it was formed, we go to one group of scientists who are particularly interested in the soil, gravel, rocks, coal, metals, oil, and other materials which make up the earth. From long experience with such things they have become skillful in telling how many thousands or millions of years passed while these earth materials were forming. They know from the position in which the materials lie how old each part of the earth is. Similarly, if the remains of plants or animals or people are found in any of the layers of rock or gravel, the scientists can get a fairly accurate idea as to how long ago they were living on the earth.

From the work of these scientists, then, comes our present story of the rocks. In order to make the story clear, they have made a kind of clock, which tells the time of the earth's history. Not in hours does it measure, but in eras. An era is a very, very long time; the longest and oldest eras probably lasted more than a hundred million years. Of course, this is longer than anyone can imagine.

To go back to the beginnings of the earth would take us back a long, long time. Some scientists say that was hundreds of millions of years ago; others say two, even three billion years ago. You and I cannot settle this question, so we shall wait for the answer from people who are making very careful studies of these questions.

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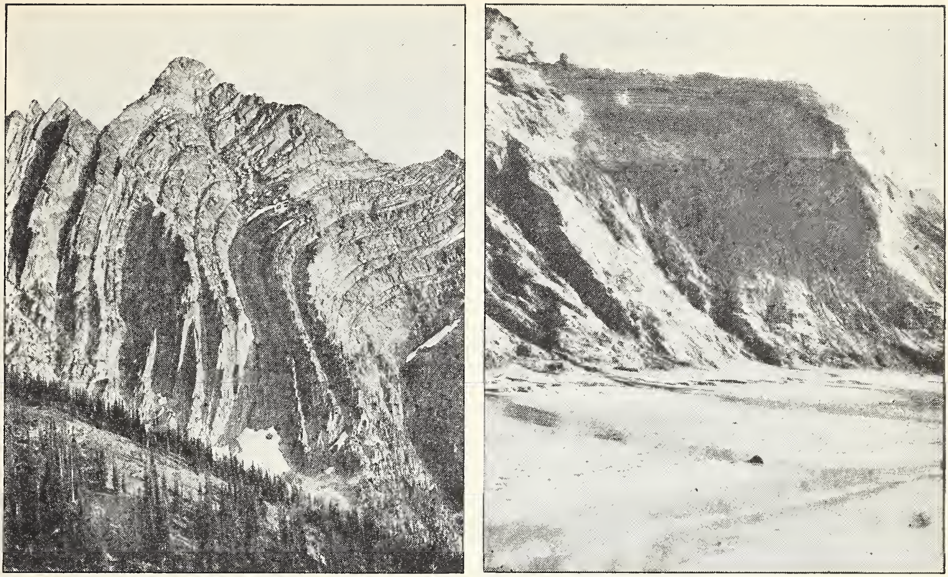
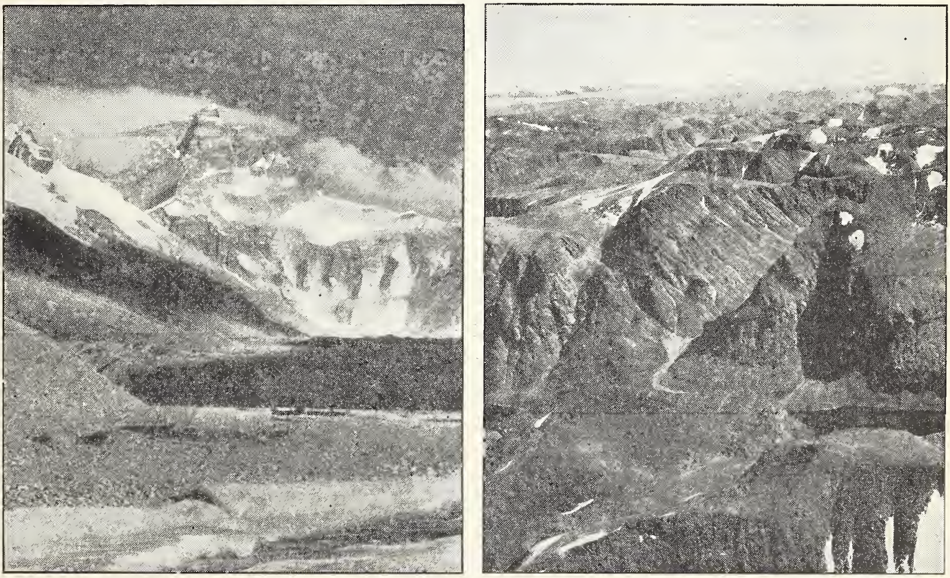
[1] If you do not know the Story of the Rocks, we suggest that you read *The First Book of the Earth*. If you have read it, perhaps you will wish to read it again quickly to refresh your memory.



a. Heaven's Fold in Montana

b. A mountain on the coast of Denmark



Ewing Galloway

c. The crest of Mount Everest in the Himalayas

d. Mountains in northern Labrador

Fig. 24. Many times the earth's crust broke, forming mountains with giant folds and wrinkles like those above

They tell us that certainly hundreds of millions of years ago the surface of the earth cooled, forming the rocky crust. The higher areas became continents and the lower areas became ocean basins. Underneath the crust the earth remained hot. Often it would break through and smash the crust and lift it up into giant, sharp mountains, both on the lands and under the oceans. Not just once did this happen, but many, many times. Then, on the lands, the rains and the wind slowly, ever so slowly, wore these young, sharp mountains down into rounded, low ones. From time to time the surface of the lands sank in places, and the oceans flowed over parts of them. As they did so, they brought in different kinds of sand and mud, which later hardened into rock. So the kinds of material in the earth's crust became very much mixed up.

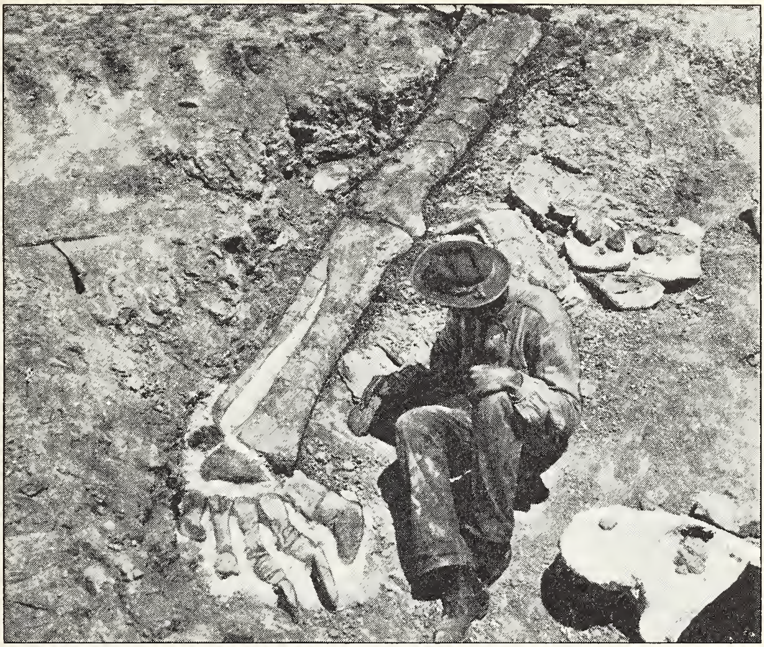
Often the earth was quiet. But after every period of quiet the hot inside of the earth would burst out again. The crust would be thrown up. The water would rush off the continents again. The shape of the continents would change; the shape of the oceans would change.

So it was that our earth was formed and changed during several vast eras of time. This is the Story of the Rocks.

Second: The Story of the Fossils

Very early, life came upon the earth. To find out when it appeared in our earth's long history and how it developed, has been the study of another special kind of scientist. We can remember him best, perhaps, by the name one child gave him — "the fossil man."

A fossil is part of a plant, animal, or human being that is caught and preserved in a layer of the earth. Scientists have dug the bones of ancient animals out of a pool of tar in Cali-



A. M. N. H.

Fig. 25. This leg and foot, uncovered in Bone Cabin Quarry, Wyoming, show how fossils tell the story of early animals

fornia. There they found a whole "dead zoo" of long ago — lions and tigers, bears and wolves, foxes, horses, dogs, rabbits, and many others. For many thousands of years, perhaps, the bodies of these animals had been preserved in this "death trap."

There have been many other traps of long, long ago. Fishes have been caught and covered entirely by mud and rock. In the ice near the north pole huge animals and fishes have been frozen. Their bodies have been discovered in our own day. In warmer lands insects were caught in the running sap of trees. After the sap hardened, it held the insects' bodies there for many ages. Today they too are being found.

Other chapters of the Story of Fossils tell how the teeth and bones, sometimes whole skeletons, of horses and dogs, elephants and mammoths, and even dinosaurs of long, long ago, were dug up. The bones of these animals have been carefully put together in their proper places, and today in our natural-history museums you can see what these ancient animals looked like. Among the most interesting ones are the "fish that walked on the land," those terrible reptiles that ruled the earth millions of years ago (figure 13).

Do you see now how the story of the earth and of plants and animals is being told from the fossils in the layers of rock and soil that hold them? Each layer is really a chapter in the Story of the Rocks. The top layers are the last pages, which tell of the past hundred million years or so. The very deepest layers go back to a billion years ago. Below these layers are rocks in which no fossils of plants or animals have ever been found. The bottom of the Grand Canyon of the Colorado River, which is a mile deep, is one of these. In this layer we can see today some of the very oldest rocks on the earth. No fossils are found there.

Third: The Story of Man

It is to still another group of scientists that we must go for the story of men on the earth. These scientists are trying to answer the questions about the beginnings of man, as well as about his development on the earth.

Let us see in brief what they have to tell us.

Where Did the Earliest Men Live?

The scientists do not agree about the region where men first appeared on the earth, but many of them believe that it was in the rolling land of central Asia. Why there? Because it is

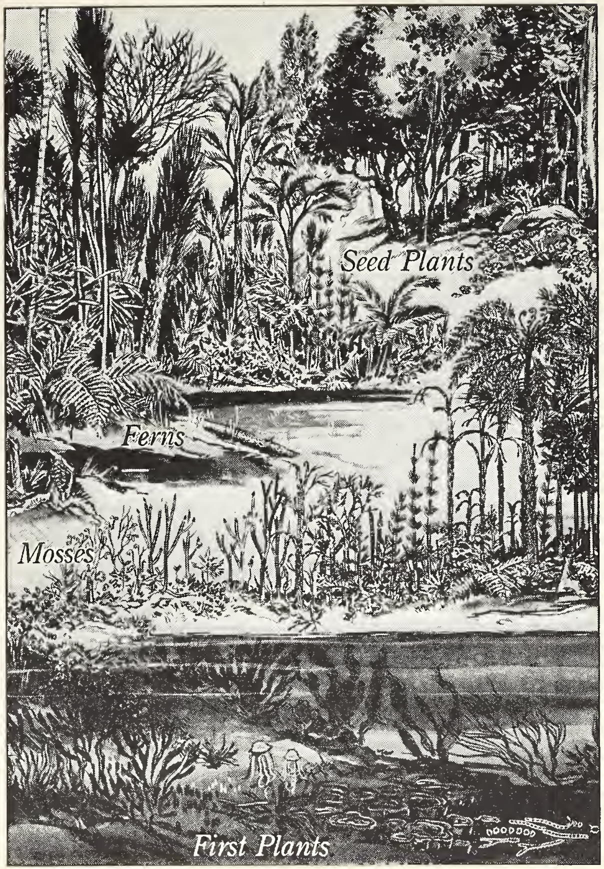
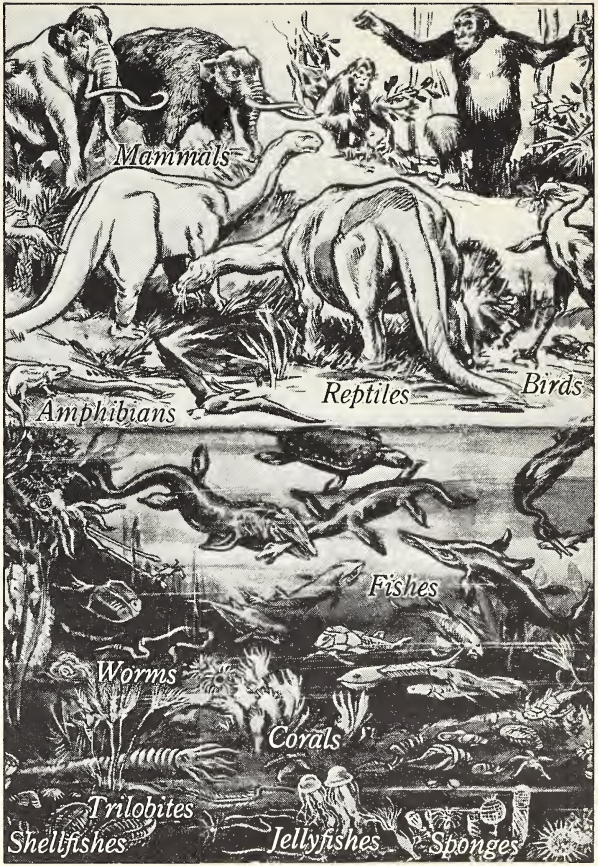


Fig. 26. The story of plants, showing how they grew and changed throughout the ages



Drawings by Logan U. Reavis

Fig. 27. The story of animals, showing how they grew and changed throughout the ages

thought that the land there was more favorable to living things than anywhere else. In that region today there are high, grassy plateaus or deserts, but during that early epoch the land was low and wooded. The climate was mild, as it is now in parts of North America and Europe. Everything was favorable, indeed, for plants and animals and man.

What Is the Story of These Very Early Men?

What were they like, these possible ancestors of many, many years ago? The people who are studying this cannot tell us yet, for they have found no complete skeletons or even separate bones or teeth which they can be sure belonged to them. They can only guess about the appearance and the ways of living of these ancestors. But there are some signs which make them think that certain things happened to these men which made them superior to all the animals.

1. *Long, Long Ago Men Learned To Walk*

There is one thing about which the scientists agree; that is, that during this time long ago early men began to use their bodies in new ways. Of course this did not happen suddenly. Hundreds, perhaps thousands, of generations lived and died. But over these many, many years, instead of moving on all fours as the animals did, men began to walk on two legs. Of course their bodies were not straight at first, but bent over at an angle. Their legs were bowed out at the knees.

2. *They Grew Thumbs and Fingers To Hold Things Better*

This walking on two legs made one very important difference. It left the front legs and feet free! Now that they were not needed for walking or swinging in the trees, they could be used for other purposes. Arms and hands could be of help in protecting them from their enemies. After all, when compared to the giant animals around them, men were small and not especially strong. They could not move very fast, and they had no shell, as some animals had, to draw back into when in danger. It was very difficult for them to defend themselves, especially against the meat-eating animals. They needed fingers to hold things, hands and arms that could be trained to throw and lift, to push and pull and pound.

And so our scientists think that the first men slowly learned to pick up sticks and stones and to hold things. When this happened, they had some advantages over the other animals. Can you imagine a tiger or a wolf picking up sticks and stones?

If you will look at your own fingers and toes, you will see why the use of the hands has been such an important advantage to man in other ways. Notice, for example, how your thumb is separated from your other fingers. The big toe is not separated from your other toes in that way. Do you think you could write well, or sew easily, or work skillfully with wood if your thumb were in the same position as your great toe? Men could not have built factories or railroads or farms if they had had no thumbs. Bridges and houses and pyramids and skyscrapers could not have been constructed. Furniture and jewelry and books could not have been made. Nor could painters and sculptors make their works of art without the help of the thumb. The thumb has certainly been very important in man's life.

Do you see, then, how the changes in man's body long, long ago made it possible for him to defend himself better and to become a skillful worker with his hands?

3. *Men Learned To Think Better*

Being able to walk upright and to use arms, hands, and fingers were great steps forward. But there was something else which men had to have in order to produce food from the ground, to design and erect permanent buildings, monuments, and bridges, to transport goods and people, to weave cloth, to invent ways of sending messages, to paint pictures, to create music and musical instruments, to learn to dance, and to do other "civilized" things.

What was this "something else" that men needed?

It was a better brain than any animal had yet possessed. In the hundreds of thousands of years that passed, man developed that too. How it happened we do not know. How long a time passed or through what stages it grew — of all these things we know almost nothing. Scientists simply know that during these thousands of years man's brain was improving. It grew much larger and was arranged much better for learning and thinking.

As long periods of time passed, this man with the better brain showed that he could plan in better ways. He began to talk, to use words to explain the ideas that came to him. His ancient ancestors had been able to make sounds; but the new man could make more sounds, and sounds which had the same meanings each time he used them. As time passed, he learned to make up words with many different meanings. Thus we see that as man's brain developed, it became a very useful possession.

And so time went on, and men changed and developed as it passed. Perhaps the men who continued to exist were those who walked best, who could best handle sticks and stones, and who had the best brains. The others, less skillful, less clever, may have died. Their kind may have passed out of existence.

And so, as families lived and died, the best bodies and best brains may have continued to live and develop until man became what we know him to be today. Most of our scientists agree that this is the story of the beginnings of mankind.

How Did Men Scatter All Over the Earth?

Perhaps you are thinking: "But how could the earliest man get to Java, or the Piltdown man to England, so far away from central Asia? And how did men of various kinds come to dwell in all the continents of the earth?"

We are not sure about the answers to these questions. Many explanations have been offered, but no one can be certain which is the true one. For that story we must go again to the scientists who study the earth. Here is one explanation that most of them are inclined to accept.

Four Long Ice Ages Changed Man's Home

Certainly one of the most important happenings on the earth was the coming of the Ice Ages. These were really stages in a single great Ice Age — each one tens of thousands of years long — when, for some unknown reason, the sun did not warm the earth as it does today. The temperature on the earth fell so low that much of the Northern Hemisphere was terribly cold. It snowed and it hailed for weeks, months, perhaps years. One blanket of snow piled on another. In some places the water froze hundreds, even thousands of feet thick, filling the valleys with glaciers — enormous masses of ice and snow. Sometimes the snow and sleet and ice were packed together until they formed mountains of ice. Gradually these mountains began to creep southward over northern Europe and North America.

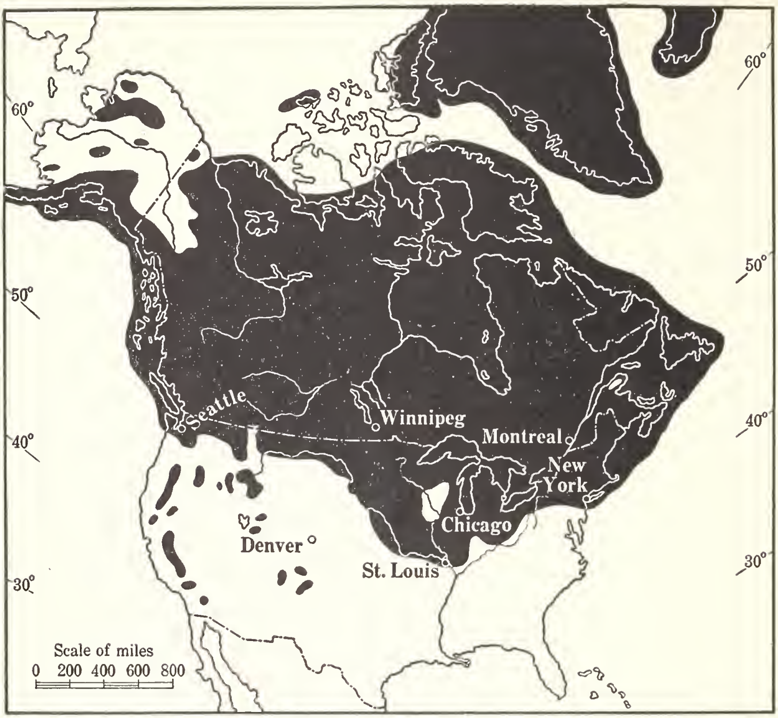


Fig. 28. The area covered by the ice sheet is shown in black

At least four separate times glaciers formed near the north pole. It is thought that the First Ice Stage came about a million years ago; the Second Ice Stage, about 625,000 years ago. The Third started about 225,000 years ago. The Fourth came about 150,000 years ago.

Figure 28 shows that in North America the ice sheet extended over nearly all of Canada and over the United States as far south as the Ohio and Missouri rivers. Figure 29 shows how in Europe the sheet covered Scandinavia, most of Russia on the east, the British Isles on the west, and much of Germany

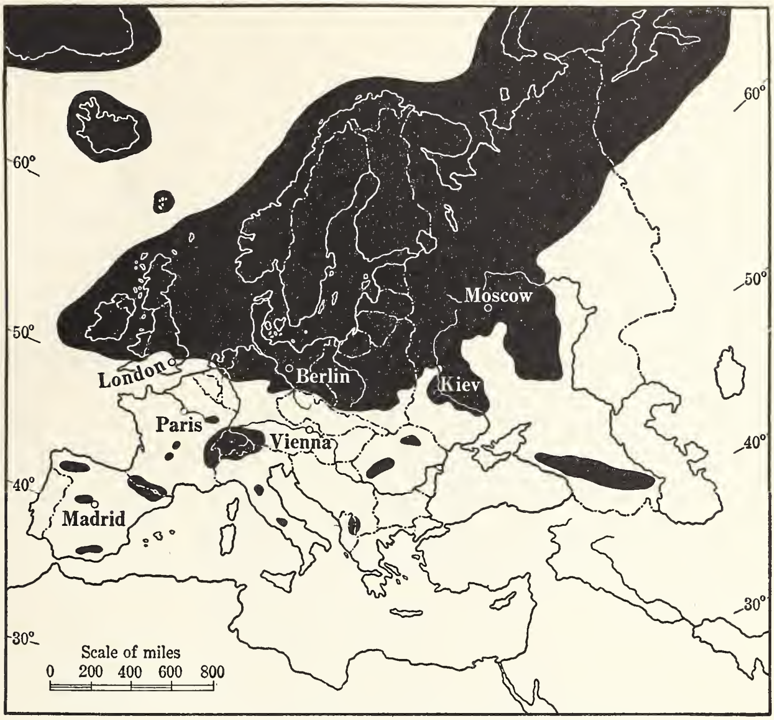


Fig. 29. Europe, showing the area covered by the ice sheet

and the Netherlands. Glaciers moved over an area of eight million square miles altogether. Slowly they came southward, killing plants and animals and people in their path or driving them southward to warm regions.

Four different times these seas of ice advanced out of the north. Four different times they slowly melted back. Each time as that happened, the northern regions of the earth which had been covered by them became warm once more. Grasses and bushes and trees grew again. These warm times between the Glacial Stages are called the Interglacial (or between-glacial)

Stages. The time since the last Ice Stage is called the Postglacial (or after-glacial) Stage. Perhaps you are saying: "Today may be a part of a postglacial stage; but we may be living in merely another interglacial period!" That may be true; our times may be only that!

It is thought that each time northern Europe was covered with ice, the higher lands of central Asia became good places in which to live. There were many rains, and these helped the grass and trees to grow. The number of animals increased, and man found that he too could live there. So we have another important reason for thinking that central Asia may have been the earliest home of men.

But how long these early men lived there and when they moved out over the earth in all directions, no one knows. Some scientists believe all this happened during the interglacial stages when the snow and ice were melting. During these times the lands of central Asia must have become dry; in many places they became even deserts. Then the people had to leave or die. No doubt some people stayed and died, but others left and tried to find places where food was to be had. Perhaps, then, many of them moved southwestward into Africa, and then northward into Europe. Some may have gone southeastward and settled in southeastern Asia and the islands of the Pacific. Others might have gone west into Europe, or east into China, while still others traveled far to the northeast, across the Bering Strait into the Americas.

Figure 30 shows how an artist imagined this traveling. If his drawing is correct, man wandered from central Asia around the entire earth during these million years of the Ice Age. But it was slow traveling, after all!

Perhaps, then, it was in some such way as this that the Java man came to live and die in Java, to leave her (or his) bones

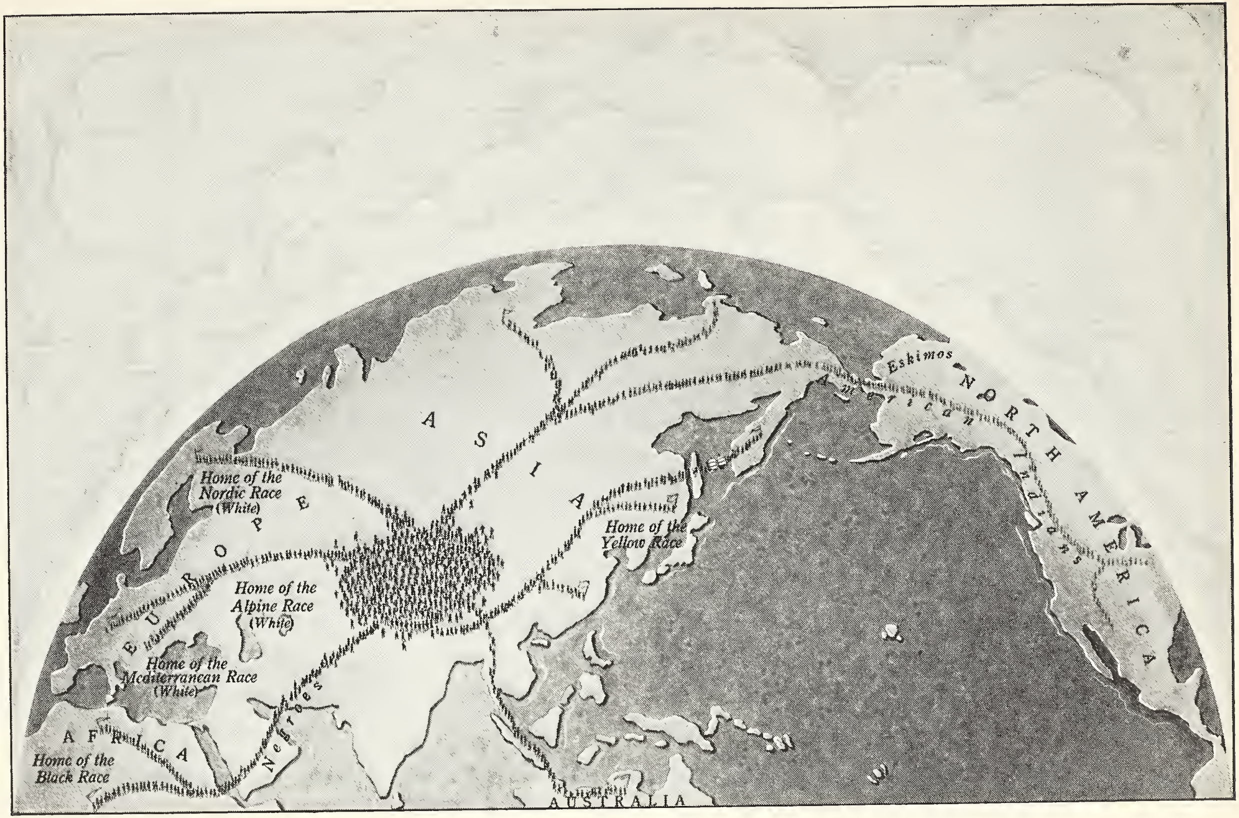


FIG. 30. Some scientists think that people lived first in Asia and went out from there to all the other continents. (Based on a drawing from *Human History*, by the courtesy of the author, G. Elliot Smith)

there for Dr. Eugene Dubois to find. So it was that the Peking man came to China. And so, perhaps, it was in some such way as this that the ancestors of man came to be on all the continents and principal islands of the earth. In these places, no doubt, they lived, had their children, and passed on to them what they knew about keeping alive. Then they died, and their children and their children's children carried on the story. Generation after generation, age after age, — indeed, a million or more years passed until we come to our own world of today.

How Did These Early Men Live?

What were the ways of living of these early men? Again the scientists can do little more than guess. Of course, as we draw nearer our own times there is less guesswork and less disagreement than there has been about the very beginnings of man. The story has been put together from discoveries which were made in Europe. They give us cues to how the Europeans of the Ice Age lived. To be sure, men lived in other parts of the earth, but we know less about their ways of living. What we do know about them seems to suggest that they lived somewhat as the early Europeans did; so the life of the Europeans of the Old Stone Age will tell us something of the life of other early men. To that story we shall turn in Chapter V.

Books You Would Like To Read

Boyle, Mary E. Men Before History. Little, Brown & Company, Boston.

Coffman, Ramon. Child's Story of the Human Race. Dodd, Mead & Company, Inc., New York.

Dopp, Katharine. The Early Cave-Men. Rand McNally & Company, Chicago.

Dopp, Katharine. The Later Cave-Men. Rand McNally & Company. Chicago.

DOPP, KATHARINE. The Tree Dwellers. Rand McNally & Company, Chicago.

ERLEIGH, E. V. M. I. In the Beginning. Doubleday, Doran & Company, Inc., New York.

HOLBROOK, FLORENCE. Cave, Mound, and Lake Dwellers. D. C. Heath and Company, Boston.

KNIGHT, CHARLES R. Before the Dawn of History. Whittlesey House, New York.

KUMMER, FREDERIC ARNOLD. The First Days of Man. Doubleday, Doran & Company, Inc., New York.

MCINTYRE, MARGARET A. Cave Boy. D. Appleton-Century Company, Inc., New York.

MIX, JENNIE I. Mighty Animals. American Book Co., New York.

NIDA, WILLIAM L. Ab the Cave-Man. Rand McNally & Company, Chicago.

VAN LOON, HENDRIK WILLEM. Ancient Man. David McKay Company, Philadelphia.

CHAPTER V

The Men of the Old Stone Age

Lost in a Forest!

IMAGINE FOR a moment that you have been lost for many days in a vast forest hundreds of miles from a town. What do you need most to keep alive? Food? Yes, first and foremost. Shelter? Yes, some place in which to keep warm and dry if it rains or snows. Certainly you must have food and shelter; otherwise you will soon die.

If there are no berries or fruit or grubs or such food in your forest, you will have to kill animals. In order to do that you need weapons. A spear? A knife? An ax? Yes, all of these. To build a hut you need tools. An ax? A knife? A hammer? Yes. To keep alive, then, you also need weapons and tools.

If a town or city were near by, how easy everything would be! Just go to a hardware store and buy fine steel tools, sharp axes and knives, well-made hammers and saws. For weapons just select a gun or revolver. Shiny "tackle" — poles, lines, and everything — are all complete for fishing.

But you are lost in a forest hundreds of miles from a town. There are no stores about, just bushes and grass and trees and wild animals and a stream. What will you do?

Slaves of Nature

Your problems of getting a living would be much the same kind of problems that early peoples like the Neanderthal men had to face. What did they use for tools and weapons? Probably clubs broken from the limbs of trees, or huge boulders which they rolled or threw down from a height upon their enemies. Did they have spears to kill fish or animals? They probably used long, thin branches with points which had been sharpened by rubbing on stones. So far as we know, their inventions did not go beyond the wooden or stone weapons that nature supplied them.

That was 100,000, perhaps 150,000, years ago.

Then — quite suddenly, scientists tell us — Neanderthal men disappeared from the earth! How? When? Why? They do not know. It is thought that this was the time of the Fourth Glacial Stage. Whether or not they were destroyed by the new cold wave that gripped the northern parts of the continents, no one knows.

Cro-Magnon Men of About 25,000 Years Ago

The anthropologists now know that about 25,000 years ago a new type of man lived in Europe. Because the discovery of the skeletons of these men was made in a cave at Cro-Magnon, France, they have been called Cro-Magnon men. But other similar skeletons have since been found in northern Africa and southern Spain, in France and Italy, — in fact, all along the Mediterranean Sea.

If the scientists are correct, these men must have looked much more like our people today than did the earlier ones of Europe. They were taller and their legs were straighter. Their heads were set much more upright on their shoulders. Their brains were large, actually larger than those of many people today. Their cheekbones were high, somewhat like those of the American Indian. They had hands like ours, which shows that they had become clever workmen. Their forebrain was like that of men today, which meant that they could think up new ways of doing things; they could invent! Altogether Cro-Magnon man was a rather remarkable human being. He was the immediate ancestor of modern man (figure 23, *d*).

At first some scientists thought that these Cro-Magnon men must have come into Europe from the warm regions of Africa. Later, however, bones of similar men were found in Poland, Hungary, and Germany. It seems certain, therefore, that another stream of them came into northern Europe from Asia.

If you will think for a moment of the climate of Africa and Asia during the last Ice Stage, you will see how reasonable it is to say that the new people came into Europe from these two continents. In these regions there had been no ice and snow. The climate had been mild, perhaps even hot near the equator. It is thought that in Africa and Asia it was easier to learn better ways of living.

On the other hand, although there were some people in Europe during the last Ice Stage, the population could not have been large. Life must have been hard in that dreary, cold land. However, with the gradual melting of the ice, more and more people could live on the continent. Plants and animals could grow on the land which formerly had been covered with ice. It was then that large numbers of people from the warmer regions moved into this continent where plenty of animals were to be found. Thus new ways of living began to spread from Africa and Asia into Europe.

Like the retreat of the glaciers, the advance of more civilized ways of living was not a matter of a day, but of many thousands of years. Look ahead to map 8, on pages 230–231. That map will give you an idea of the steps by which a more civilized life spread, first into southeast and then into northwest Europe and finally all over the world. There are differences of opinion among scientists about the exact time of these happenings; but, in general, they agree that changes were taking place steadily after the last retreat of the ice northward.

Notice particularly that the long period just before our own Age of Civilization is called the Stone Age. The Stone Age is really two ages. The earlier is called the Old Stone Age; the one nearer our own day is called the New Stone Age.

The Invention of Stone Tools

How did men invent the first stone tools? We do not know. But we can imagine that one day a primitive man sat knocking two pieces of flint together. Now the best of all stone for tools is flint, a dark gray or brown stone found in veins of chalk in certain parts of the world. Flint is better than other stones because it can be chipped easily by pressing or striking one piece against another. If enough chips are taken off in the right way, the edge becomes very sharp. Such a sharp-edged piece will make an excellent tool for cutting or scraping.

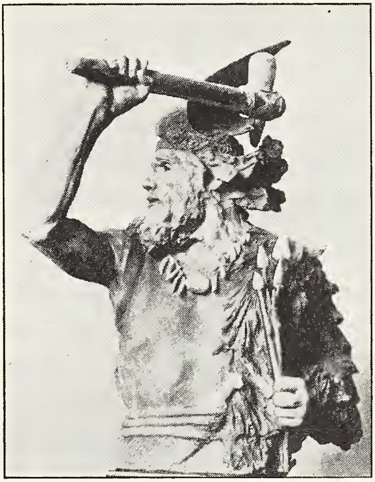


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Fig. 31. What does the picture tell of the tools of Stone Age men?

Perhaps thousands of men in many places had been chipping pieces of flint without discovering this, but suddenly an idea came to one primitive man. By sharpening the flint he could make a spearhead, or an axhead, or a scraper, or even a knife. Of course these things did not happen all at once; many years passed before they appeared, and many primitive men helped in their invention. But gradually such weapons and tools came into use. At first they were rough and crude because only a few chips had been removed. Later, in the New Stone Age, they became fine and beautiful. The best of the New Stone Age tools and weapons were marvelously made. They were made smooth and beautiful wholly by a method of polishing without chipping. Modern men who have worked at this art for years have failed to do as well as the craftsmen of the New Stone Age.

You can understand one reason, then, why people of the Stone Age wandered over the earth. They looked for the chalk beds which contained flint. Flint or some other hard stone had become a necessity in their way of living.

The Stone Age People Were Wandering Food-Gatherers

There were other reasons why Stone Age people lived a nomad life, moving here and there, never settling in one place. Notice map 6, pages 108–109, especially the places where the bones of these men have been found. Do you see that most of them were buried near rivers or streams? You can easily understand why this was true. In the first place, they could not live without water; in the second place, it was in rivers or streams that they caught fish for their food.

For other kinds of food our Stone Age men also had to hunt. They searched for the homes of animals which could be killed and eaten. From figure 27 you can see what animals lived in Europe during the various ages. At certain periods there was the mammoth, a huge animal which has now disappeared from the earth. He was covered with heavy, woolly hair which hung nearly to the ground. His back sloped from his high head to his short tail, and he had curved tusks. Then there was the lion. And there was the rhinoceros. These animals were large and very dangerous. How could man, so much smaller and weaker, ever attack and kill these huge beasts? It does seem impossible. Yet we know from huge mounds of bones which have been dug up around the remains of campfires, that Stone Age man did kill and eat many of them.

Now for a surprise about these Stone Age men! Although all of them knew how to chip and polish tools from stone, only those of the late New Stone Age had any agriculture. For thousands of years wild grains and other plants had been growing all around them. We know that men knew how to use these grains as food. But they ripened and died without Old Stone Age man's ever discovering that crops could be raised from seeds planted in the ground.

Thus Stone Age people lived a nomad life, moving here and there, never settling in one place. They traveled in small groups — a man and a woman or two, and some children. Occasionally the numbers may have been a little larger, but most of the time little bands of relatives lived and traveled together.

Men of the Stone Age Learned To Protect Themselves from the Weather

We can scarcely imagine life without protection from the wind and weather. The very idea makes one shiver. Yet during the earliest ages man had neither warmth nor shelter.

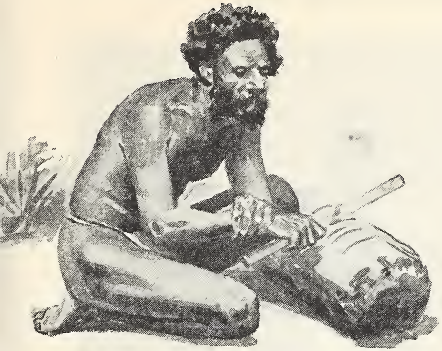
That is, perhaps, one reason why the discovery of fire was so important. Just how or where man used fire for the first time, no one knows. In *Man at Work: His Industries* we told the story as the scientists think the use of fire may have begun. Do you remember how lightning in a thunderstorm or the rubbing together of stalks in a bamboo grove had often started fires? At first man was frightened at the roaring flame and heat, but later there came a time when he saw that they could be useful as well as harmful.

For long ages man probably made use of such "natural" fires. But what did he do between one lightning storm and another? between one bamboo fire and another? He just waited, because he did not know how to make fire. Then some man found, by accident perhaps, that by striking flint against a certain kind of iron (pyrites), sparks flew out. If these were caught in dry leaves at just the right moment, they would start a fire. For ages afterward people started fires in this way. In other parts of the world men learned to start fires in other ways, as the pictures of figure 32 show.

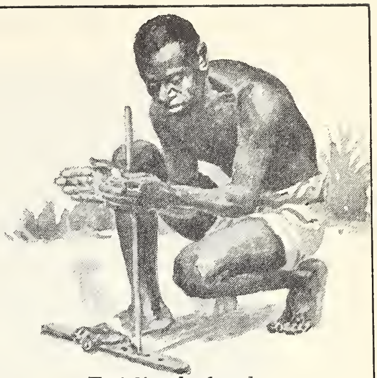
But no matter how fire was made, it became an absolute necessity to the Stone Age man. It kept him warm. It furnished the heat to cook his food. Its light protected him from wild beasts. It was, indeed, a wonderful discovery!

But the Stone Age man needed to protect himself in still another way. During the Fourth Ice Stage the days and nights grew colder. Eating and sleeping in the open became very unpleasant. Perhaps Stone Age man began to move to the sheltered places to get away from the cold wind. But soon he found that even that was not enough. He must move up under overhanging cliffs and into the mouths of caves. As time went on, he moved farther back into the cave. He became a real cave dweller. Near the mouth he built his fire. Inside, he and his family could be warm and dry. No doubt he enjoyed this warm cave house.

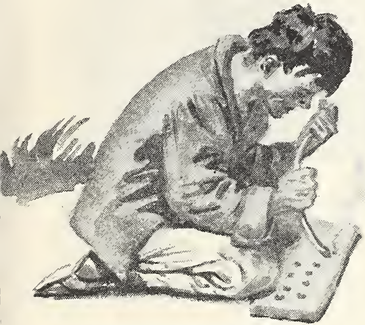
How did living in caves change the life of these Europeans of the Stone Age? For one thing, they were beginning to live less wandering lives than before. The caves were homes to which they could come back each night after the hunt. They were still far from living the settled life which we know today, but they were one step nearer to it.



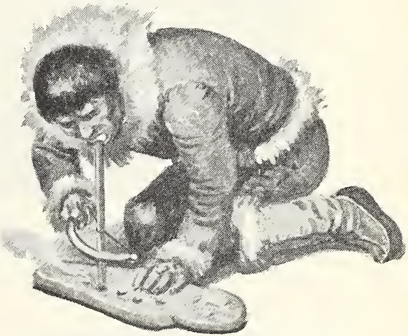
Rubbing pieces of wood together



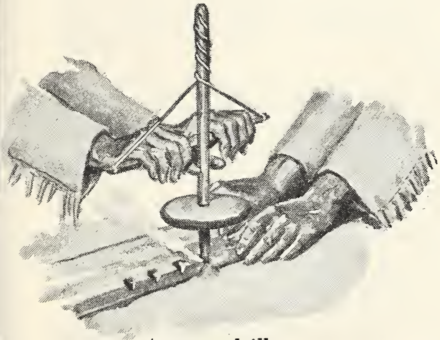
Twirling by hand



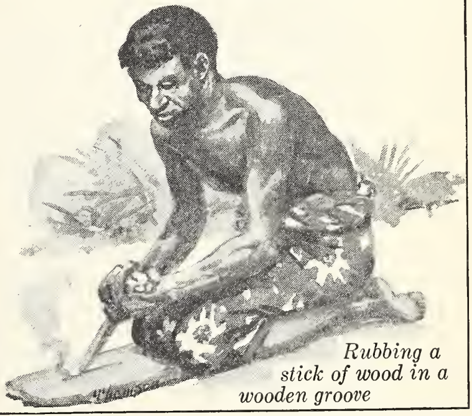
Using a hand drill



Another form of hand drill



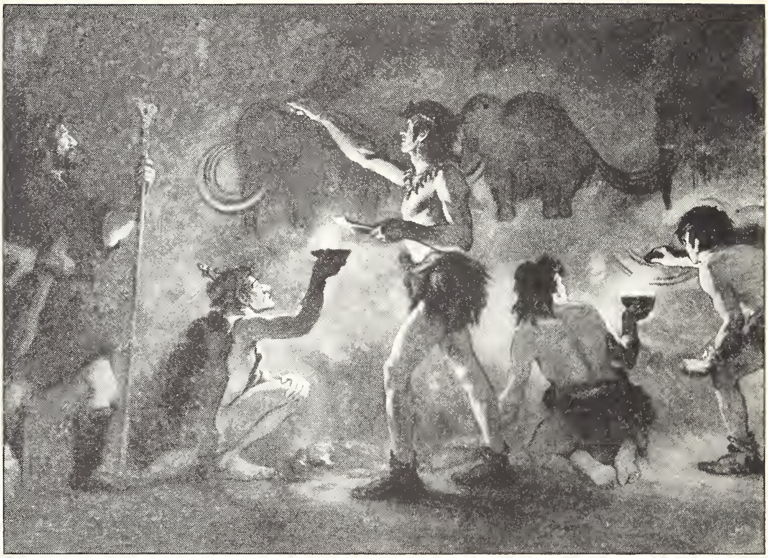
A pump drill



Rubbing a stick of wood in a wooden groove

After Bettmann Archive

Fig. 32. Primitive ways of making fire



A. M. N H.

FIG. 33. The cavern of Font-de-Gaume in Dordogne, France, shows that Cro-Magnon men were artists, recording the important events in their lives

Men of the Stone Age Could Make Beautiful Things

We generally think of art as belonging to what we call civilized people. If so, these men of Europe 25,000 years ago were well on their way toward civilization. They carved and drew and painted beautiful things.

Especially were Cro-Magnon men artists and craftsmen. On bones and on the antlers of reindeer they carved the animals which they followed in the hunt. From ivory and from soapstone they carved little statues of human beings. Finest of all, perhaps, were their cave paintings. On the walls and ceilings of cave rooms, often far back from the entrance, these artists of the days before history made marvelous paintings of bisons and reindeer, of horses and mammoths, of wild cattle.

Let's take a trip to such a cave which has been found in the Pyrenees Mountains between Spain and France. This one is about a mile long. We must go single file along a dark, winding passageway. Here and there huge boulders stick out. Some places are so narrow that it would be very difficult for a fat man to get through. But, once at the end of the long trail, we find ourselves in a huge underground cathedral. This is the room which Cro-Magnon man used for his picture gallery.

We walk around the room. Here on the wall is a picture of a wild pony painted in black and white. Note his flowing mane and his jolly, snub-nosed face. The whole picture is quite large too, four or five feet across. How well it is done! Every part of the body seems to be the proper size and in the proper place.

Look beyond! These artists must have been able to write, too. Notice all the lines and dots. That must have been a system of picture-writing. These two marks look like two different kinds of clubs. To the left of them are many dots arranged in such a way that they seem to mean special things. This pattern of one dot in the center of a circle of other dots has been used in two places.

What's over on this side? It is the painted figure of a bison rearing back on his haunches. Notice how the bison's back is painted in a place where the rock wall sticks out a bit. This makes the back look more than ever like a back. Do you suppose the artist put it there for that reason? Perhaps. Notice the patch of red paint just over the bison's heart. It looks like an open wound!

Can you imagine the Cro-Magnon artist of so long ago working patiently at his paintings by the light of a torch? From figure 33 you can get some idea of the kind of work he did. If you go to France, perhaps you will wish to go to see these paintings.

This is our last glimpse of the men of the Old Stone Age. Soon after painting the walls of their rock caverns, they disappear from our sight. Just where they went, these many wandering hunters and artists, we do not know.

In our next view of Europe new peoples and a new kind of life appear. With their coming we shall see men who are still more like us, and ways of living that are still more like our own. But, somehow, we are sorry to see the last of these ancient men who held the center of the stage for so many thousands of years.

Books You Would Like To Read

CLARK, M. G. and GORDY, W. F. Early Story of Mankind. Charles Scribner's Sons, New York.

DOPP, K. E. Early Herdsmen. Rand McNally & Company, Chicago.

EVANS, WAINWRIGHT. The Thunder Bird, the Story of Fire. Thomas Nelson and Sons, New York.

HALL, H. R. H. Days Before History. Thomas Y. Crowell Company, New York.

KINER, GRACE. How the World Grew Up. Follett Publishing Company, Chicago.

LANSING, M. F. Great Moments in Science. Doubleday, Doran & Company, Inc., Garden City, New York.

MEREDITH, CLIFF. Fire! Reynal & Hitchcock, New York.

STEPHENSON, M. B. Caves, Tents and Houses. Thomas S. Rockwell Co., Chicago.

TRENT, GREGORY. In the Stone Age. Harcourt, Brace and Company, Inc., New York.

PART III

The Cradle of Civilization

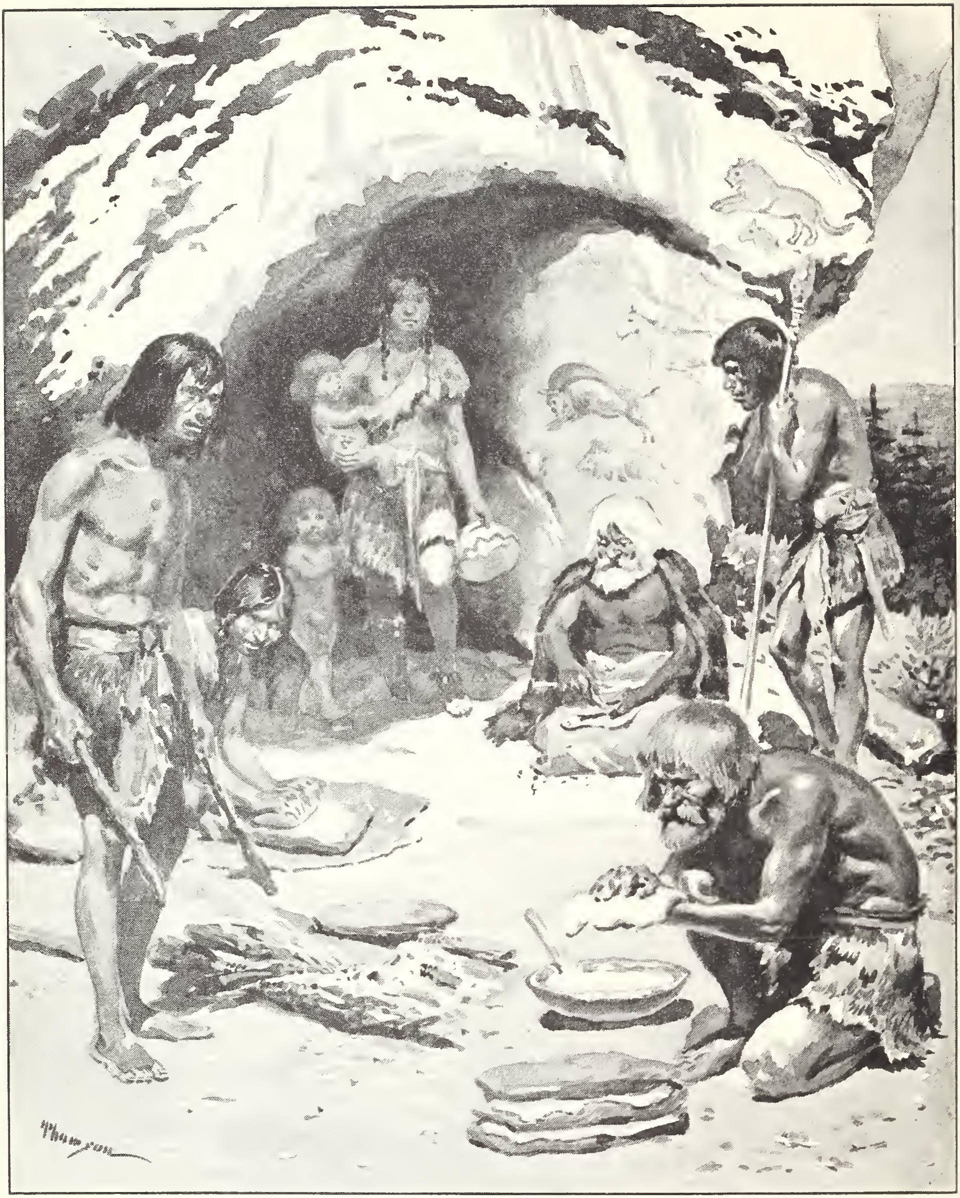


FIG. 34. An artist imagines how a Stone Age family lived thousands of years ago

CHAPTER VI

The New Stone Age Brings the Beginnings of Civilization

An Important Thing about Men: They Do Change Their Ways of Living

Man might have continued to live in the same way, hunting and fishing and living in caves, even to the present day. He had found it good enough, perhaps. He had shown himself superior to the other animals. He had learned to protect himself from the weather. He enjoyed much of his life, no doubt, as men of all ages have a way of doing.

But there is something about man that makes him keep changing. He moves to a new land when the food supply gets low. He finds a better way to make a tool or weapon. He changes his style of dress when the old ceases to be what he wants.

Always, in one way and another, man keeps finding new and often better ways of doing things. Do you think that perhaps this way of thinking and doing sets him off as being different from the animals?

As we look back upon the thousands of years which go to make up the Old Stone Age, we see that man had made a number of startling changes during that time. That these were important inventions, and that man's way of living had been greatly improved, we cannot doubt.

What Old Stone Age Man Knew

What could Old Stone Age man do that the creatures before him could not do?

He could walk upright, as we do today.
He could do skillful things with his hands.
He could think more clearly, plan better, and invent new ways of doing things.
He could probably talk, could communicate with his neighbors by sounds as well as by movements of the body.
He had discovered how to make fire, to cook food, to warm himself, and to have light in dark places.
He had learned to make his home in caves.
He had invented and perfected chipped tools and weapons of stone.
He knew how to make simple clothing of animal skins.

This much, at least, Old Stone Age man of 25,000 years or so ago knew and could do.

Was the achievement great? When compared with that of Java man or Neanderthal man it was very great! But scientists say that civilization had not even begun!

What does that mean? What are the "marks" by which you can tell whether or not people are civilized? Let us see.

The Word That Includes All Ways of Living Today: Civilization

As you have read earlier, there is a single word for all the ways of living of a people; that word is civilization. In general, civilization means that the people have such ways of living as these:

They live settled in one region; they do not wander about from place to place.

They raise food, live in permanent houses, and make and wear clothing. They are not food-gatherers.
They make things by means of tools or machines, either with their own muscle power or with engines.
They trade back and forth, transport people and goods, buy and sell with "money."
They have organized governments to decide their group problems.
They have beautiful painting, sculpture, and crafts, music, poetry, theater, and other arts.

These are not the only marks of civilization, but they will be enough to show how people of the Old Stone Age differed from those that were to come.

WITH THE COMING OF A NEW STONE AGE, CIVILIZATION SLOWLY DEVELOPED

How Long Was the New Stone Age?

You have already learned that ways of living do not change suddenly. Thousands of years go by while new inventions are thought up and customs change. So it was 20,000 and more years ago. Hundreds of generations lived and died. We come now to 14,000 B.C. or even 12,000 B.C. By that time the ways in which Stone Age peoples lived had changed very much indeed. Differences could be seen so clearly that one could say: "This is no longer the Old Stone Age; it is now the New Stone Age."

How long did this New Stone Age last? We do not know exactly. But historians think that the beginnings of civilization were taking place gradually in certain centers during all the years from about 14,000 B.C. or 12,000 B.C. to about 4000 B.C. That marks off the New Stone Age as exactly as it can be done, and makes it from 8000 to 10,000 years long.

Let us see what was happening during that time.

An Example: The New Stone Age Peoples of Europe

Since more is known of how civilization grew in Europe than in any other part of the world, let us see what was happening there in the New Stone Age.

The Lake Dwellers: New Stone Age People That We Feel Sure About

In Switzerland the year 1854 A.D. was so very dry that the level of water in the lakes fell very low. In one of the lakes the water dropped so low that the remains of an ancient village of lake dwellings were exposed to sight! Almost at once scientists went there in large numbers to study them. They found the log foundations of the houses that had been built out over the water. Many utensils, tools, implements, and ornaments were discovered. There were things of wood, bone, stone, and clay; remains of foods; ornaments for the hair and the body; and the like. This village was a rare find; for it gives us much information about the New Stone Age people who lived there.

Since that time remains of lake dwellings have been found in other parts of Europe, particularly in Scotland, Ireland, and England. From all these discoveries scholars conclude that by 7000 years ago men had settled down on the shores of lakes and were living "civilized" lives. What changes in ways of living had come to make the scientists come to these conclusions?

First, the tools and implements from these more recent times were of fine polished stone.

Second, the permanent houses showed that the people were living settled in a single place and had begun to plant seeds and grow crops.

Third, in addition to hunting wild animals for their meat, these New Stone Age men had begun to raise sheep, goats, and pigs. They had learned to feed these animals and to train them to do some of their work; that is, they had "domesticated" animals.

Fourth, they cooked their food and no longer ate only raw meat.

Fifth, they had learned to make pottery of clay and to weave baskets of reeds and cloth of fibers such as flax.

In such ways as these New Stone Age men lived in Europe 7000 to 10,000 or more years ago. Clearly it was a much more "advanced" life than that of the Old Stone Age men before them. Clearly human beings were closer to having real "civilization."

Had these peoples of Europe of 7000 to 10,000 years ago invented these new ways of living by themselves? We do not know, but it is thought that they did not. The geography of the land there does not seem favorable enough. But there were places on the earth where the conditions were favorable.

Three Centers Where New Stone Age Peoples Probably Developed Better Ways of Living

If some historian on a distant planet could have looked down in later New Stone Age times and observed the doings of people all over the earth, he would have said: "Well, well, well! Things on the earth are changing, indeed! People seem to be gathering together in certain places. I seem to see two near the Mediterranean Sea and there are many smaller ones scattered about in Europe, near lakes and rivers. There's another big one in eastern Asia along that great river. Well, the people of the earth seem to have stopped wandering about and to have settled down to make their living out of the ground. It looks as if man might develop some real civilizations after all!"

If a historian of great vision had so spoken about 7000 or 10,000 years ago, he would have been correct, for at last men were beginning to invent more "civilized" ways of living. Not in all parts of the earth was this happening, but in three centers particularly. Later these civilized ways of living were to spread out and out among other peoples until at last, in our own times, most of mankind was to be affected.

The first of the three regions was that stretching around the east end of the Mediterranean Sea.

The second was in the Yellow River valley in China.

The third was in Central America and South America. (Find these three regions on map 6, pages 108–109.)

We shall look first at the rise and spread of civilized ways of living around the Mediterranean. We do that for three reasons: first, it is the region about which most is known; second, it is believed to be the region where civilization first started; third, it is the region from which our own European-American civilization developed.

How Civilized Ways Began in the River Valleys near the Mediterranean Sea

A Region Important in World History

It is in two river valleys near the Mediterranean Sea that we must look for the rise of civilization. One is Egypt, the land watered by the Nile River. The other is Mesopotamia, the land watered by the Tigris and Euphrates rivers. Mesopotamia is the region which included the Babylonia and Assyria of ancient times.

Neither of these valleys, however, can be considered by itself. The history of each is so closely tied up with that of the lands around it that we have to think of all this region — southwest Asia and northeast Africa — as one.

Look at map 6, and fix this region near the joining of Asia and Africa in your mind. You will want to remember it; for in that region, it seems certain, arose the new civilization which was later to spread around the Mediterranean Sea, north into Europe even as far as England and Scandinavia, and thence — in the past 400 years — across the Atlantic to America and to every other continent of the earth.

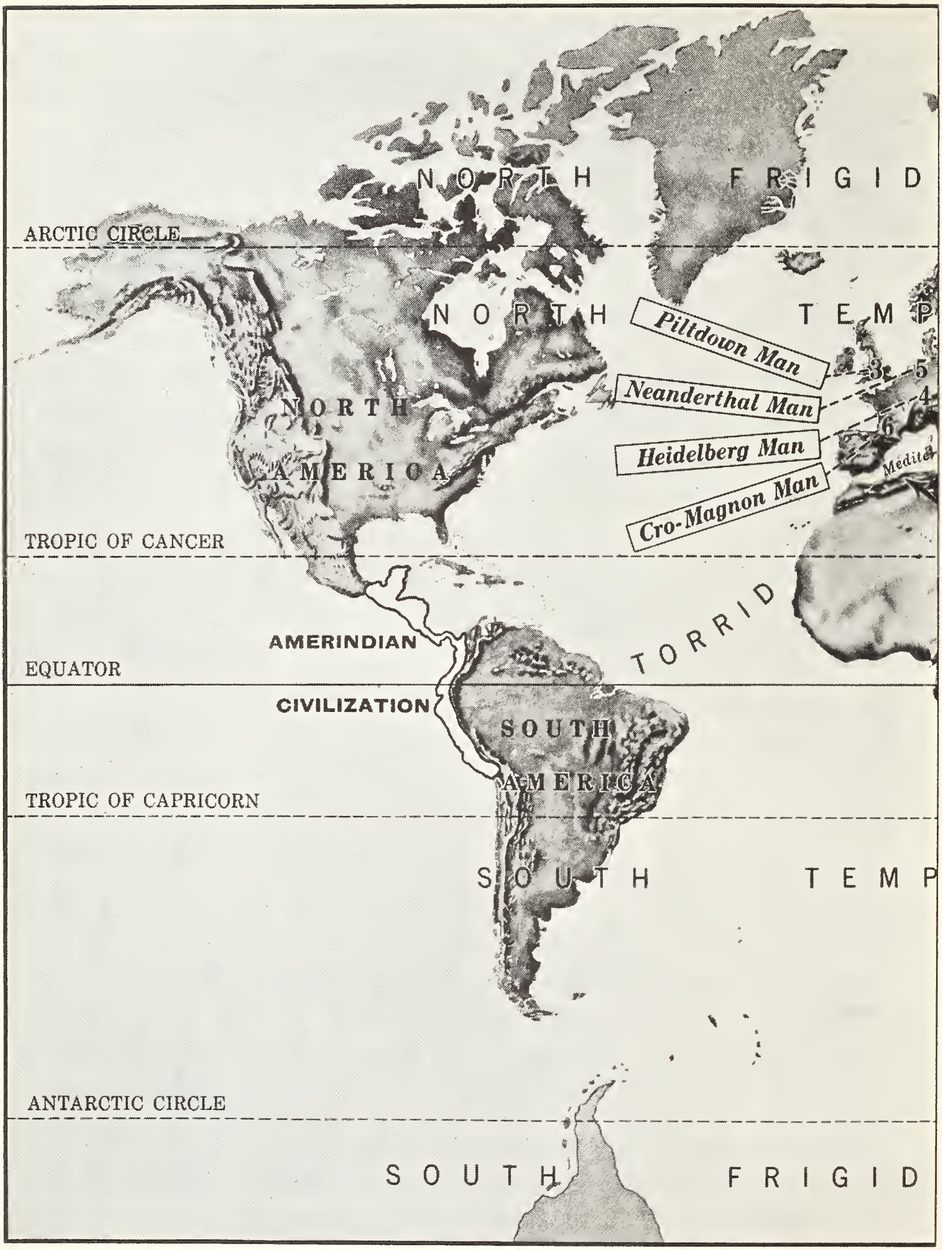
Egypt, the Favored Land of the Valley of the Nile

As you can see from the map following page 124, the Nile flows from the highlands of the African Sudan northward to the Mediterranean. On each side of the river lies a narrow strip of black fertile land covered with luxuriant green. Beyond that, on either side, lies the barren desert of sand, where water and food are hard to find and where unfriendly animals like the scorpion and the cobra live.

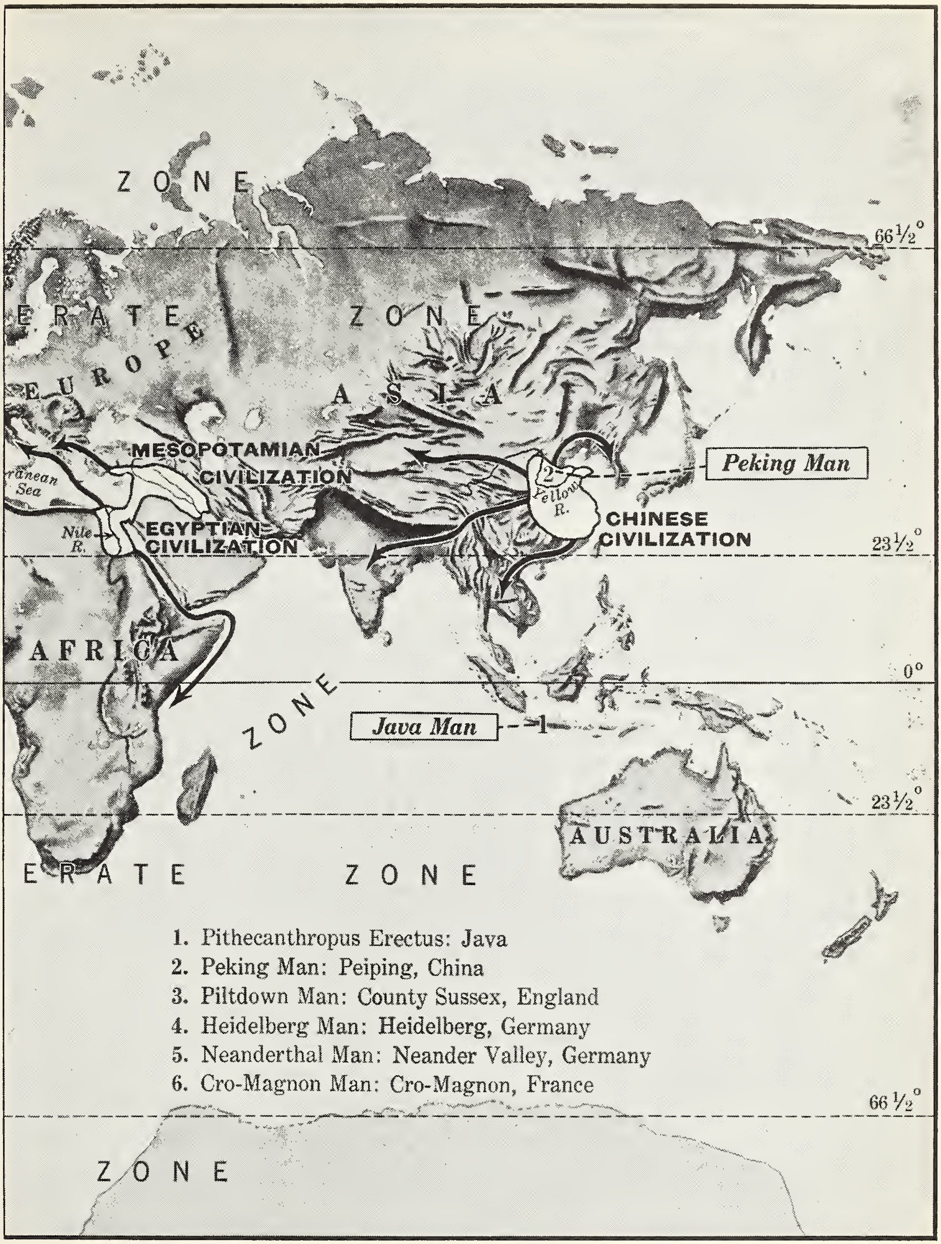
Northern Africa was not always as it is in our times. When Old Stone Age man roamed along the southern shores of the Mediterranean 25,000 years ago, all that country was more fertile than it is today. In those days too the Nile was a huge river far higher and broader than it has been during the last few thousand years. Along the banks were forests and marshes.

To this region came the roving, hunting, wild-grain-gathering people of the Old Stone Age. It must have seemed to them a good place to live. The days were warm. Water was at hand. There were animals to kill. There were wild grains and grasses with which to increase their food supply. Here nature was indeed favorable to man.

It was on the fertile banks of this great Nile that New Stone Age men probably learned how to plant the seeds of some of the wild grains and to cultivate crops. At least, that is what scientists today have concluded from their studies.



Map 6. Three early centers of civilization and six places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1
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AUSTRALIA
ERATE
ZONE
1. Pithecanthropus Erectus: Java
2. Peking Man: Peiping, China
3. Piltdown Man: County Sussex, England
4. Heidelberg Man: Heidelberg, Germany
5. Neanderthal Man: Neander Valley, Germany
6. Cro-Magnon Man: Cro-Magnon, France
66½°
ZONE

where the bones of primitive man have been found

How the Geography of the Nile Changed the People from Food-Hunters to Farmers

The fertile Nile region lies between about 20° and 30° north latitude (see the map following page 124). This is a near-tropical zone of warm winters and hot summers, with very little rainfall throughout the year. Let us see what effect this might have on ways of living. We shall begin with food, since the matter of food-getting was so important to the Egyptians.

You remember that Old Stone Age men and New Stone Age men had spent most of their time from morning till night, all their lives long, hunting for food. The people who lived along the Nile River all this time had been getting part of their food from the wild barley that grew on the banks. The rest of it consisted of nuts, millet, the flesh of birds, ducks, geese, quail, fish, and the meat of wild animals. They made little attempt to store up food for the future, eating what they found the day they found it.

But some time between 6000 and 8000 years ago a great change came about. Someone — or many someones — got a few very important ideas from watching and studying the Nile River. This great river rose high in the mountains of Ethiopia. Each spring and early summer the water came rushing down from the highlands, overflowing the land as it went. With it came new rich soil (called silt) which was spread over the low land along the stream. This overflowing of the river is called "the Inundation."

To this day the Inundation of the Nile occurs fairly regularly each year. It reaches lower Egypt about the middle of July. Higher and higher the water rises until by October all the fields are flooded. For six or eight weeks the river drenches the land. Then the waters slowly go down, leaving a rich soil spread on top of the land. After that several winter months follow when the sun is less strong. The fields are moist and warm. Then, in the spring, — March, April, May, — grasses and wild barley grow up quickly in the tropical sun. Before the heaviest Inundation comes again in July, all the grains have ripened.

It was these three geographic conditions taken together that probably taught the people of the Nile valley to raise food from the ground.

First. The soil was so very fertile that rich crops of grain could grow in it.

Second. The sun beat down from clear skies most of the year. In 4000 B.C. there was very little rainfall in this region. Even today it is not very different, for the region receives only two inches a year.

Third. The Inundation of the Nile supplied the needed water nearly every year. It also brought new soil from the highlands to improve the old worn-out soil.

It is true, of course, that there were great differences in the Inundation from year to year. In some years the flood was great; in others the water was scarce. Seeing how important the river was to them, the people sang many hymns to it. One of these is as follows:

Thou waterest the fields which Re created,
Thou givest life unto the flocks and herds,
All the land drinks thee when thou descendest in rain from heaven.
When thou cometh the whole land rejoices.
Thou art the bringer of food,
Thou art the mighty one of meat and drink,
Thou art the creator of all good things.
Thou fillest the storehouses, thou heapest high with corn the granaries,
And thou hast cared for the poor and needy.[1]

[1] British Museum, Sallie Papyrus II, No. 10182. From E. A. Wallis Budge, *The Dwellers on the Nile.* The Religious Tract Society.

Thus you can see that geography set the stage on which thinking men could work out the marvelous play of civilization. This has been true in every land and in every period of man's history.

At Last Man Became a Food-Producer

Who was the first among the dwellers along the Nile to get the idea of planting wild wheat and barley seed in a fertile, well-watered spot? No one knows. When did they do it? No one knows. Perhaps no one will ever know, for those who first had the idea left no records behind them. Perhaps the idea did not seem very important to them, once they had thought it up.

Perhaps it does not seem very important even to you. But if you stop to think of the differences between a roving, hunting life and a settled, farming life, you will see that this change accounts for all civilization as we know it today. It accounts for all the kinds of civilizations which we shall watch developing throughout our story.

Of one thing we can be fairly certain. That is that by the end of the New Stone Age in Egypt — about 7000 years ago — agriculture was a regular part of man's life. The sowing of barley, millet, wheat, and flaxseed, the cultivation of the fields, and the harvesting of the crops had come to occupy a large part of his attention. He had settled down to live in one place instead of wandering around. He was a food-producer rather than a food-gatherer.

He Domesticated Animals to His Use

Nor was this all. Not only did New Stone Age man cultivate grains which had once grown wild. He also tamed some of the animals which once he had hunted. New Stone Age man in Egypt had sheep and goats and cattle of his own. These provided him with part of his food. Some animals, such as the donkey, provided him with a means of transporting things from farm to market and from town to town.

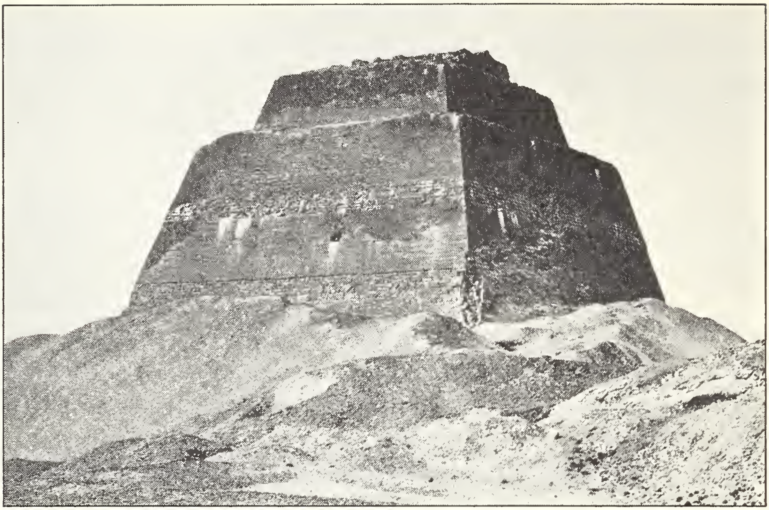
To be sure, New Stone Age man still hunted and fished, but more and more of his living came from regular farming and animal-raising and less and less came in the unplanned ways which his ancestors had used.

Permanent Houses: Reed and Mud Huts

When our Egyptian no longer roamed about, he began to find a home necessary, and so he learned to build huts of the reeds which grew so plentifully in the neighborhood. These reed huts were then plastered with the mud of the Nile valley. Of course there was nothing fine about such a home. It consisted of one tiny room set on the bare earth. And no doubt it was dirty and bad-odored too, for New Stone Age man was not particularly careful about removing the remains of his feasts from the neighborhood of his house. But, nevertheless, these huts were permanent dwellings, and they were the beginning of something new.

Better Workmanship in Stone

To carry on farming, this man of Egypt now needed hoes and plows and rakes and other tools. As long periods of time went by, new and better weapons and tools were invented. These were still made of flint and other hard stones, but they were beautifully and carefully finished. Many of them were not merely flaked, as were those of the Old Stone Age, but were polished until they had a smooth sharp edge. Indeed, the stone tools and implements of these Egyptians were probably the finest ever made by any people. Among



Ewing Galloway

Fig. 35. This pyramid, started by King Snefru in 4750 B.C., shows that the Egyptians of more than 6000 years ago knew how to build permanent buildings of stone

them were ripple-flaked knives, polished axeheads, and wooden scythes set with teeth of stone. If you will look at figure 38, you will see pictures of some of this ancient work in stone.

Crude Baskets and Pots

With abundant crops from his fields, the ancient Egyptian found need for something in which to store the grains and other things against a later day. Vessels of some kind became a necessity. Baskets had been used for a long time, but they could not hold liquids. To make this possible New Stone Age men learned to line them with mud and clay.

There came a time when New Stone Age man noticed that the mud on his huts became harder as it stood in the sun.

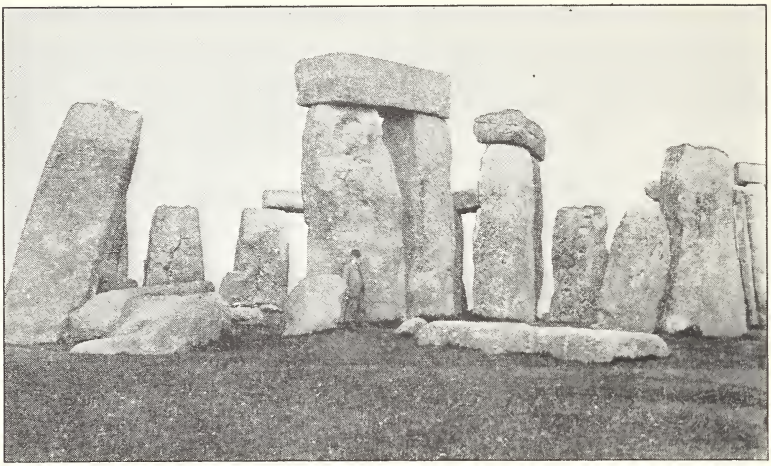
And so, perhaps, was suggested to him the idea of a great invention — the making of pottery out of the ever-useful clay. Then these vessels were baked in the open fire and decorated in various ways. One particular method of firing or baking produced black-topped red vessels. Others had designs traced on them with a sharp tool. Sometimes the designs were made of straight lines; at other times they were pictures of objects, such as boats. Often the spaces were covered with a white paint as an added decoration. Altogether, the early Egyptian was very successful as a potter. Much of his work we think beautiful even today.

Breadmaking Invented

This age in Egypt brought forth still other new arts and crafts. One of these was the grinding of barley and wheat into flour and the baking of bread. The women, who became the breadmakers, ground the grain on milling stones, which were a large flat stone and a long grinding stone. The grinding stone was rolled back and forth, back and forth, over the grain, which lay on the flat stone. Thus flour, although coarse and uneven, was made. This was moistened and formed into cakes and then baked; at first in fires built in the ground; later, in crude ovens.

Spinning and Weaving, and the Making of Garments and Ornaments

No longer did men wear only the skins of wild beasts. They had clothing made of linen cloth, which the women had woven from flax. As decoration they wore necklaces of beads and shells, bracelets of ivory and mother-of-pearl, anklets, earrings, all kinds of ornaments made of flint.



A. M. N. H.

Fig. 36. This monument at Stonehenge in England shows the beginnings of building in that region

New Transportation Invented

For hundreds of miles up and down the Nile lived groups of people such as we have described. They traded back and forth with one another on their great river, which, throughout the history of Egypt, was to be the main highway of the country. From vases, clay models, and rock drawings we know that these men had boats with sails and oars. These were used constantly, for war as well as for peaceful trading trips.

Religion and Burial of the Dead

Perhaps one of the most interesting things about these New Stone Age people was their searching for new ideas. They had begun to wonder about why things happened in the ways they did. For example, they thought much about life and death. It seemed strange to them that one day they should be "alive,"—farming their land, caring for their stock, making pottery and things of flint,—and the next day they should be "dead," quite unable to do these things.

Apparently the thought came to them that life must continue after death. We think that New Stone Age people had such ideas, for they began to bury their dead very carefully. A shallow pit was dug, and the dead body was laid on its side with the knees drawn up and the hands in front of the face. Around the body were placed the favorite possessions of the person who was dead — flints and pottery and ornaments. There, too, food was placed. All these things they thought might be needed in the life beyond the grave.

Such examples as these will show us that New Stone Age man was, indeed, developing a civilized way of life.

Books You Would Like To Read

Beard, D. C. American Boys' Book of Signs, Signals, and Symbols. J. B. Lippincott Company, Philadelphia.

Dopp, Katharine. The Early Farmers. Rand McNally & Company, Chicago.

Hibben, Thomas. The Carpenter's Tool Chest. J. B. Lippincott Company Philadelphia.

Hodgdon, J. R. The Enchanted Past. Ginn and Company, Boston.

Kummer, F. A. The First Days of Knowledge. Doubleday, Doran & Company, Garden City, New York.

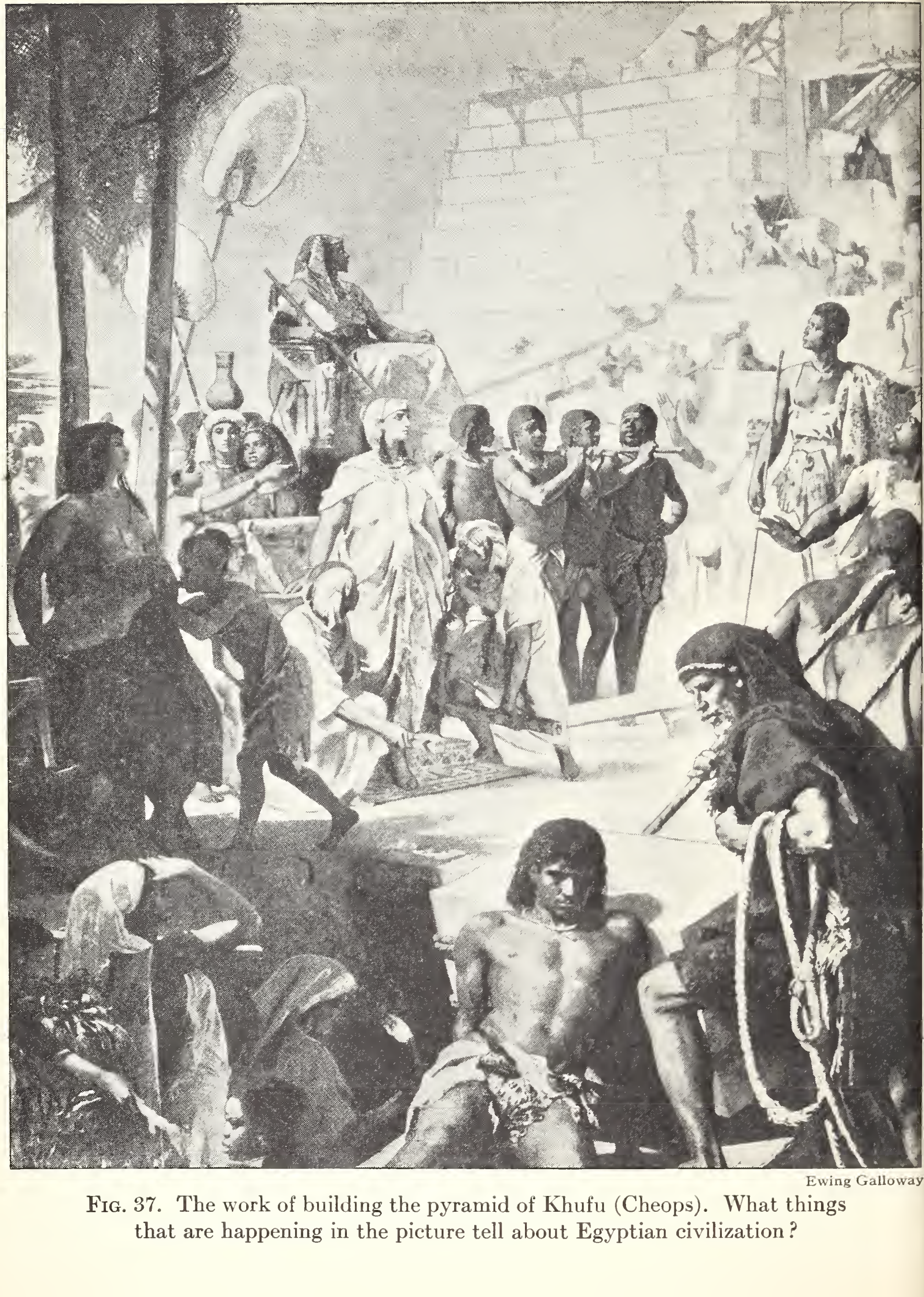
Lansing, Marion Florence. Man's Long Climb. Little, Brown & Company, Boston.

McNab, Allan. Picture Book of Rivers. The Macmillan Company, New York.

Mills, Dorothy. The Book of the Ancient World for Younger Readers. G. P. Putnam's Sons, New York.

Nida, W. L. Inventions and Discoveries of Ancient Times. Albert Whitman & Company, Chicago.

Van Loon, H. W. Ancient Man. Boni & Liveright, New York.



Ewing Galloway

FIG. 37. The work of building the pyramid of Khufu (Cheops). What things that are happening in the picture tell about Egyptian civilization?

CHAPTER VII

The First Advanced Civilization Arose Out of the New Stone Age in Egypt

Then from 5000 to 7000 years ago a wonderful civilization arose in Egypt. It was a time when temples and pyramids appeared. It was a period of beautiful works of art and writing. Many remarkable inventions were made. Even today this civilization is considered one of the greatest in the history of man. Yet it was really the child of that simple New Stone Age which we have just described.

How the Archaeologists Have Pieced the Story Together

How did it happen? We do not know exactly the steps by which this astonishing civilization grew out of the New Stone Age. No written records have been found to give the names of persons, descriptions of events, or dates. But other kinds of records have been discovered by the archaeologists. These eager students, many of them still living today, have dug up "mummies" — the preserved bodies of people — from the ruins of ancient graves. In the stomachs of these mummies foods have been found which the scientists have been able to recognize, even after 6000 years, as wild barley, millet, fish scales and mutton bones! Many tools, weapons, and utensils, as well as the skeletons of animals which had been killed and placed in the graves with the mummies, were discovered. Carvings and paintings on stone walls, columns, and statues made 6000 or more years ago have given them other information.

With these records the archaeologists have been putting together more and more of the story until now they have a fairly good account of it from about 6000 years ago to the present day. Of the changes that occurred before that time they cannot be sure. It is only from what they know about the ways of living of the Egyptians of later date that they can work toward an understanding of the ways of living in prehistoric days.[1]

What, then, do the scientists have to say as to how the Egyptians came to build large cities, beautiful temples and pyramids, and a vast system of irrigated farms? How do they explain the beginnings of time-telling and the calendar, of measurement and language? What do they tell us of the Egyptian theater, music, and other arts? Let us see.

THE WORLD'S FIRST STEPS IN AGRICULTURE AND CRAFTS

After living along the Nile year after year, generation after generation, the people did begin to notice that certain things happened regularly.

"Every year about the same time comes the Inundation," they said. "Every year, after the water goes down, wild grain grows; that is, it grows if the fields are well watered." They noticed too that during some years the Nile was too low to overflow its banks. In such years the wild crops were poor. In other years the water came down with a rush and brought too great a flood. Then, too, there would be little wild barley.

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[1] For the descriptions in these chapters we rely on the findings of such scientists as the late Professor James H. Breasted of the University of Chicago, Sir Grafton Elliott Smith, Howard Carter, and Sir Leonard Woolley of England. Although these archaeologists differ among themselves on some small matters, they agree on the general course of the rise of civilization. It is their conclusions that we follow here.

Gradually the thinkers among the Egyptians got several important ideas from watching the Nile and its annual Inundation. No doubt these ideas came one by one, not all at once. No one is even sure in which order they came. But they led to new ways of doing things that were to change the whole course of Egyptian life.

1. The Idea of Storing Wild Grain Led to Many Crafts

One idea that certainly came to the Egyptians was that they could gather enough wild barley to last for a whole year. That gave them food until the next Inundation had come and gone and the next crop of barley had been harvested. When the grain had been stored, there was no need to hunt for food day by day.

Now to store grains and other things required containers. You have already learned that some of the New Stone Age peoples knew how to line their baskets of reeds and grasses with clay, which hardened in the sunlight or near a fire. Some of them had begun to make pottery. They shaped these articles with their hands and with tools, and then baked them in very hot fires. But for supplies of grain large enough to feed whole villages, even towns of people, larger storage places than baskets were needed. It is thought that for these the Egyptians built storehouses.

Exactly how these storehouses were made and of what materials, of what sizes and shapes, we do not know. It is likely that mud was used — possibly baked bricks or even wood; at any rate, materials which did not last very long. No traces of them have been found. If the storehouses had been built of stone, some of them would probably have lasted even to the present time.

2. Irrigation: The Idea of Flooding the Land with Water

Having thought up the plan of storing food, the people along the Nile went on to other new ideas.

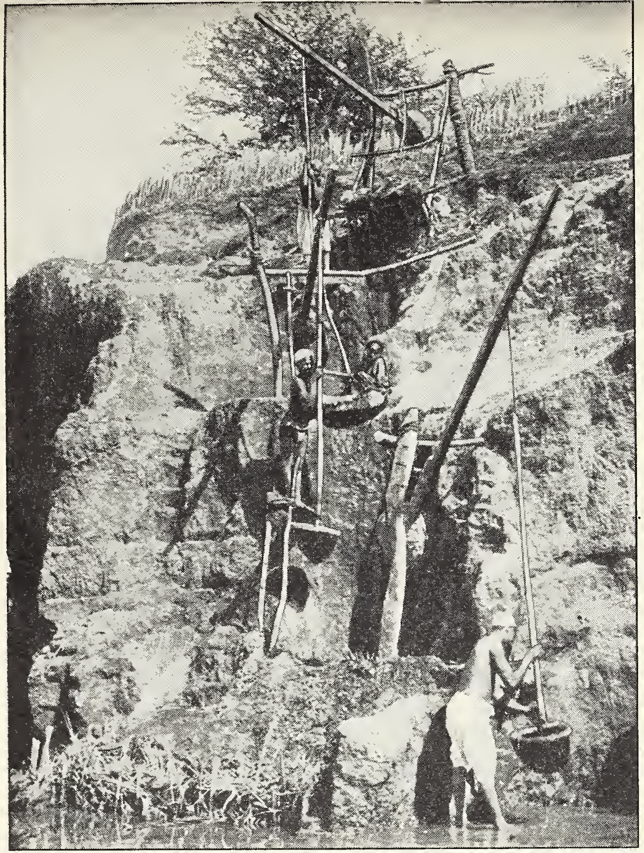
"How can we make sure that our fields have enough water to nourish the grain?" worried the headmen of the villages. "What can we do if the Nile should be low again next year?"

Woe to Egypt, even today, if there is a low Nile and the fields are not covered with water! Then the harvest will be small, and many Egyptians will starve. And woe to Egypt if there is too high a Nile, for then the seeds are washed out of the ground! Therefore the weeks before the Inundation has reached its height are anxious ones for all of Egypt. And as it is today, so it was in ancient times.

Whenever people are faced with a serious problem, someone usually comes along to solve it. At least that is what our men of science think as they study the way man has thought of new ideas. Perhaps that was what led the Egyptians to invent one of the most important ways to bring water to fields that would otherwise be dry.

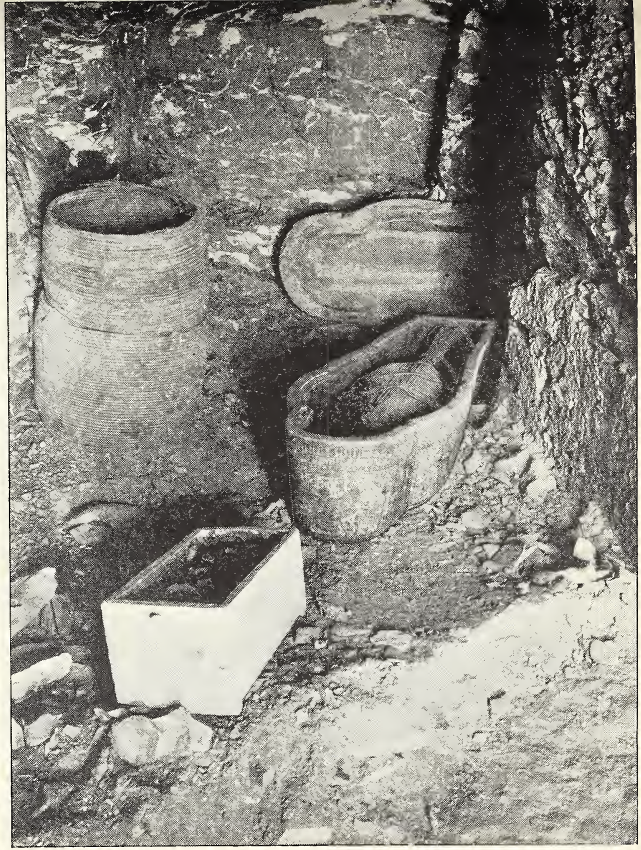
You have read in many places, and figure 38 reminds you, that sooner or later people who live in desert lands must face the problem of finding a way to put water on their soil. They may carry the water in tin cans, as people do in China, Japan, and the Philippines. Or they may build a dam across a mountain stream to form a lake, letting the water down on the desert plains below in dry seasons. This is done today in our own southwestern states. Or they may pump water up from rivers; or they may do something else. But if plants are to grow on any desert land they must have water at the right times.

Furnishing that water to lands which are naturally dry is called "irrigation."



Underwood and Underwood

Fig. 38. The Egyptians of thousands of years ago invented the shadoof, or well sweep, to irrigate the land. Similar ones are still in use today



Metropolitan Museum of Art

Fig. 39. This coffin and mummy were found in a temple near Thebes. They show that the Egyptians of 3000 years ago buried their dead in tombs

About 6000 or 7000 years ago the people of Egypt discovered a way to irrigate the land. Perhaps in a year when the sun was so hot that it dried the fields and scorched the grain, the Egyptian people knew they must bring water up from the river, which was many feet below, and pour it over the dry soil. And then it was that bright Egyptians invented implements to help to do it.

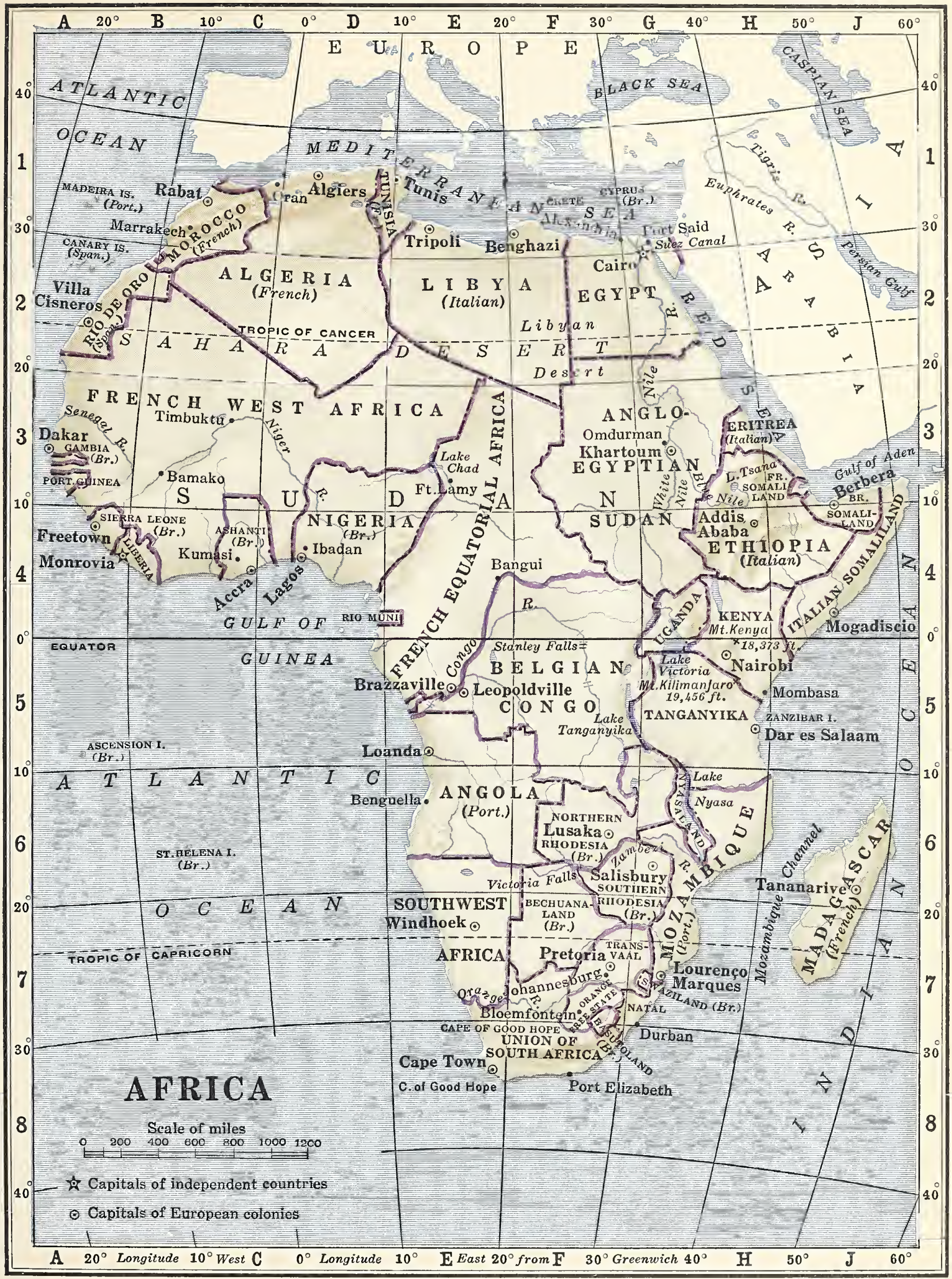
One such invention, helpful though clumsy, was the well sweep, or shadoof (figure 38). Even today the well sweep is still being used, not only in Egypt but on farms around the world, including some in the United States. On the bank of the river a long pole was set into the ground. At the top a crosspiece was fastened, making something like a seesaw. One end of the cross pole was large and heavy; the other, thin and light. On the light end a bucket was fastened.

The well sweep was worked by pulling the empty basket on the light end down into the river and filling it with water. After it was filled, the heavy end dropped down and pulled the light end up. Higher and higher went the bucket until it reached the level of a ditch. Then it was emptied into the ditch, and the water flowed out to irrigate the fields. Since a bucket holds little water, the same thing had to be done over and over again, hour after hour, day after day.

Sometimes, as figure 38 shows, the water had to be raised more than once before it reached the ditch.

A backbreaking job, you think? Yes, but consider how much more work would have been required without the well sweep. People would have had to walk up the steep bank with each bucketful of water! The well sweep was, indeed, one of man's important power aids.

The water wheels (figure 116) were other power aids. They are used even today in some parts of the world.



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3. Another Idea: Cultivating Grass Seeds Called Cereals

So it was that for a long time the people of the Nile valley irrigated their fields and harvested the grains that grew naturally in the rich soil along the banks. How long they did that before they got the idea of planting seeds, we do not know. But finally some wise man (or men) began to understand that it was the seeds which fell from the ripened plants that became new plants. Perhaps it seems strange to you that men should have taken so long to discover what every child knows today. But when they did get the idea that seeds could be planted and crops could be raised, it was possible for them to change from wandering to settled peoples. Some scientists say that this change marks the beginnings of civilization.

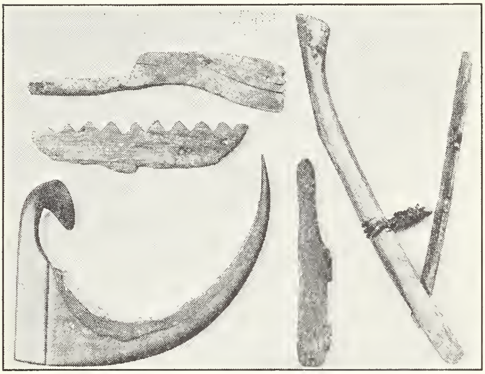
The Six Most Important Cereals

Of the 200,000 different kinds of plants on the earth the most important to man are "the grasses." There are about 4700 different kinds of grasses. These include the large number of meadow and pasture grasses on which cows and other animals feed. They include also sugar cane, which is a grass that gives the world's population one third of all the sugar it uses. Bamboo is another grass which is used in many ways in the tropical parts of the earth.

By far the most important grasses are the six cereals which now supply human beings with much of their food. These are:

Barley
Wheat
Corn
Rice
Rye
Oats

The story of how the cereals have spread to all parts of the earth is really the story of man's travels on the earth. Wherever men have gone they have taken with them the seeds of their cereals and the knowledge of how to raise them. Before 1600 A.D. this spreading of the cereals took place very slowly. Settlers and traders and travelers went out from the Mediterranean region, where wheat and barley and rye had grown, from India, where rice had grown, and from Mexico, perhaps, where corn had grown. As the barbaric people in the new lands began to live settled lives, they learned from the newcomers how to raise wheat and corn, barley and rye, oats and rice. So it was, we think, that the knowledge of the growing of cereals spread over the whole earth.



Metropolitan Museum of Art

FIG. 40. These agricultural implements made of wood and stone show some of the tools of the early Egyptians

4. Still Another Idea: the Invention of New Implements

New ways of farming required new implements. You can well imagine that at first the digging was done with the very crudest of tools; perhaps just a long stick with a curved end — a kind of hoe. Then some inventive man thought of fastening a flat piece to the end of a pole to make a better hoe.

Much later, of course, and with the taming of animals to do man's work, came the plow. Today we scarcely think of the importance of the plow. But not until the plow had been invented could anything but the simplest hand agriculture be carried on.

So it was that the early Egyptians began to depend less and less upon nature and chance by taking over the work of planting seeds and caring for their crops.

With the New Agriculture Villages and Towns Grew

In the days when the Stone Age men in the region near the Nile were food-gatherers they had lived scattered over the countryside. People who hunt animals for their chief food really cannot live close together. Not enough animals can be caught to feed a large population. In Egypt the population grew slowly, too. Children who did not have enough food to eat died of starvation.

After the rich crops began to supply food, people began to draw closer together along the Nile. As more and more fields were cultivated, more children grew up, and the population increased. As generations passed, it increased even more. Finally many thousands of people crowded into the whole river valley.

What difference did that make in the lives of the people? Interestingly enough, civilization seems to have grown up in lands where people lived close together. It is there that they could come together often; there that they could learn from one another. So it was in Egypt. As the food supply increased and the population grew, so also civilization developed along the Nile.

The Use of Metals Helped To Make Egyptian Civilization

When last you read of the New Stone Age people, they were using tools and weapons of stone. Now stone has been a useful material for man; he has done many things with it. But you know how simple our civilization would be today if all our tools had to be made of flaked or polished stone. And so it would have remained in Egypt. The ancient Egyptians could not build an advanced kind of civilization until they had learned to use metals as well as stone. Indeed, the change from stone to metal was another real mark of civilization.

Copper Seems To Have Been Discovered First

Scientists believe that the first metal to be used by man was copper, although it is possible that the bright beauty of gold had already attracted his eye. Long, long before the dawn of history, gold had been used for necklaces and other ornaments.

It seems that the first use of copper was also for ornaments. In graves over 6000 years old copper bracelets and copper beads have been found. As time went on, this newly discovered metal was used to make many useful implements: needles, chisels, axeheads, daggers, and the like. These were of much the same sizes and shapes as were the stone tools and weapons, but they cut better. Better work could be done with them.

How and where the discovery was made that copper could be formed into useful as well as beautiful articles, no one knows. In *Man at Work: His Industries*, you remember there was a story of how it might have happened. Whatever the way, someone finally discovered that heat could melt copper. Then someone else got the idea of molding copper. Soon this metal became the material out of which many things were made.

It is certain that there was copper and also a precious stone called turquoise in the Sinai peninsula, which extends into the Red Sea. Find it on map 7, on page 149. From time to time after 3000 B.C. the Egyptians sent expeditions to the Sinai peninsula to get copper. Once as many as 8000 people made the trip. Among them were workmen of various kinds, as well as doctors, clerks, inspectors, and others. Some means of transporting the valuable metal back to Egypt was necessary; so about 5000 asses were taken for this purpose. Such an undertaking was a difficult and important one, for the trip was not easy to make in those days. The long journey was made partly by sea and partly by land through the desert. Soldiers had to accompany the travelers to protect them, for at any time they might be attacked by the desert-dwelling food-gatherers.

Bronze: The First Alloy

Copper is certainly not a perfect material for tools and weapons. It is so soft that the knives, axes, and daggers made of it can be easily bent and broken. That is the reason why the people of Egypt welcomed a new metal — bronze. You remember from your earlier studies that bronze is an alloy, a combination of copper and tin. This alloy is much stronger than either single metal.

Where or how bronze was invented, we do not know. It seems reasonable to say that it was made first in a place or places where both copper and tin were found. Since tin is more rare around the Mediterranean, scientists think that bronze-making may have begun in Spain, or in one of the islands of the Aegean Sea, or somewhere in southwestern Asia. Wherever it happened first, bronze began to be used in Egypt.

When people began to make their new implements out of bronze, all the stone ones, which had still been used during the copper period, were thrown aside. A new age had come.

Iron Was the Next To Be Discovered

It was the discovery of iron ore, however, and the melting of it in hot fires that brought man much closer to the civilization of today. The very first uses of iron are also hidden in the far past. We do know, however, that about 3000 B.C. iron — still a rare and valuable metal — began to be used for swords and lances. As time went on, new iron-ore fields were found, and gradually the metal came into common use. More and more things of iron took the place of those made of stone, copper, and bronze.

So metals helped to lay the foundation for Egyptian civilization and for the civilizations which were to follow it.

People Began To Belong to Different Groups, or "Classes"

It is thought that in the thousands of years before civilization arose in Egypt, the people in any one tribe or group did somewhat the same things and lived in much the same way. The men did the hunting, and later the farming and raising of cattle. The women took care of the children and prepared the meals. At first they too cultivated the fields, but later they did the spinning, the weaving, the grinding of grain, and such tasks. Most of the people did some work. Many, no doubt, were industrious; others were not. Some were better off than others. But, on the whole, the differences among them were not very striking.

Gradually this condition began to change. In one way or another — we do not know just how — certain people began to get more wealth and power than others. Perhaps those who were more clever and those who were more ambitious got the better of the slower ones. Today we know there are great differences in people. Some are intelligent; others are dull. Some are strong; others are weak. There are many other kinds of differences in people. Very likely this has always been true of all the peoples of the earth at all times.

After the early Egyptians settled down to live as farmers, there was more wealth in their country than there had been in the hunting days. This made it possible for certain men to get a larger share of things than others. They had more land and more animals. They cultivated more grain than others. With their wealth they got other people, free or slave, to work on their land. And so, even before written history began, we find that the population was made up of many groups, or classes.

WITH THE BEGINNINGS OF CIVILIZATION ORGANIZED GOVERNMENT GREW UP

What Is Government?

When people began to live in villages and towns along the Nile, they found that it was wiser to have certain people decide things and run things for all of them. Most of the farmers, for example, did not know how to irrigate and care for the soil. They did not know how much seed to plant or when to plant it. Someone had to study the inundation of the Nile each year and make plans to irrigate and cultivate the land. Most of the craftsmen had no idea about the number or sizes of the implements and tools they should make. Someone had to teach them exactly what to do. So the custom grew that those who knew these things taught the others. And it happened in Egypt that as people came together to live those who planned and carried out things best became the leaders, or "governors," of the others. As time went on, the people became organized, and the leaders became the "government."

No doubt you know what it means to have a government. When you hold a class meeting or a committee meeting to discuss some matter, how do you handle the discussion? Does everybody talk at once? Does one person manage the others and tell them what to do? Probably not. No doubt your class has officers to carry things on smoothly. That is, you have elected a chairman, who presides over the meeting. It is his duty to see that each one has a fair chance to speak, to ask questions, to suggest new ideas. When the time comes to decide a question or problem, he sees to it that each student has the chance to vote. The votes are counted, and the group accepts what the majority (more than half the class) has decided. In other words, your class has a government.

Every community, large or small, has a government to run its affairs. Even the little villages must have officials to care for the roads, to see that there are schools for the children, to prevent crime and the like.

Kinds of Government

Now there are different kinds of government, but two kinds are of most importance today. First, there is government by a dictator, in which a single man, sometimes aided by a small group, runs the people's lives. That is the kind found in Germany, in Russia, in Japan, and in many other countries today. This is "autocratic" government, or dictatorship.

In certain other countries there is a second kind — democracy. The people of England and France and our own United States like this kind of government best. Our whole history has been an attempt to become free to run our own affairs, to develop a democratic government. Abraham Lincoln, a famous president of the United States, called democracy a "government of the people, by the people, for the people."

In a democracy all the people help to decide things. Men and women over a certain age (usually 21) can vote and hold office. In later chapters of this book we shall see that for hundreds of years leaders have tried to give more and more of the people a share in their government. It has been a long struggle to build the government of free people.

HOW "ONE-MAN" GOVERNMENT AROSE IN ANCIENT EGYPT

Ancient Calendar-Makers and Engineers Became Kings

In order to understand what kind of government the ancient Egyptians developed, we must study the calendar. Are you astonished? No more so than we were when we learned what the archaeologists found out. They discovered from articles and records found in tombs and on tablets that along with irrigation came the invention of the calendar. The two probably came together.

To us the idea of the calendar is very simple. "Why, of course! A year is 12 months, 52 weeks, 365 days, except in leap years, when it is 366 days. A year extends from a certain date, let us say January 1, or February 10, or September 23, or any other date, in one year — let us say 1938 — to the same date in the next year, 1939. How simple! We all know how to read the calendar." [1]

That is true; but before 4000 B.C. in Egypt nobody had invented the idea of a year, or a month, or even a week. They knew how to measure time by days, of course. Long had they observed that light and darkness followed each other regularly as the sun rose and set. Probably even most New Stone Age people had known that. Often they expressed distance by using time, saying "That place is so many 'darks' away or so many 'sleeps' away," . . . "I was there so many 'suns' ago," and the like. But longer periods than the day had not been measured.

How, then, did these Egyptians measure time? The archaeologists think that leaders among the people noticed that the Nile flood came again and again after a certain length of time had passed. It always came when the weather was hot and after the wild barley had been harvested. Today we know that it starts about July 19 to July 21 regularly year after year. After they had learned to plant seeds, the time when the inundation would appear became very important. It helped them to know when to prepare the fields and to sow the seeds. So, gradually, the people began to expect the inundation of the river and to measure time from one flood to another.

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[1] If you read again Chapter XXV, "Time and the Calendar," in *Man at Work: His Arts and Crafts*, you will recall the story.

They also began to think of time in terms of the moon. For thousands of years Stone Age men had watched the moon as it changed from a thin curved line ("new moon") to a bright circle of light ("full moon"). Night after night they saw it growing bigger and bigger, then smaller and smaller, until it had disappeared entirely from view. Then after a bit the new moon appeared, and the same thing happened again.

Perhaps as the thinking men among the Egyptians learned to count, they discovered that there were always twelve new moons from the beginning of one inundation to the next. By about 4000 B.C. they had worked out the idea of the "year," with 12 lunar (moon) months of 30 days each. Later they also provided for extra days in each year, since this system gave only 360 days. Our scientists think that this calendar, measured by the number of moons, was used for a long, long time.

As time passed, some of the thinking men of Egypt began to know in advance (that is, to predict) when the flood of the Nile would begin. Such skill must have made them seem like prophets. The people began to depend upon them and to accept them as their real leaders.

Gradually these leaders were given more and more power over the lives of the people. They took charge of irrigating the fields. They decided the planting of seeds and the harvesting of the crops. They built storehouses and other structures. They managed the repair and use of tools and implements. It is believed that finally they became the real rulers, the nobles, whose directions were obeyed as commands, whose words became law. And one among them — perhaps the best prophet of the inundation, or the best irrigation engineer, or the best "politician," or one who was all of these combined — became the chief noble, or king. The Egyptians called him Pharaoh. This name comes from two words that mean "great house." Then, as now, the rulers and the nobles lived in great houses; the common people, in little mud huts. Here, then, was one-man government. Here was a dictatorship.

Along with the Pharaoh and nobles were other persons of importance. In Egypt the people believed in many gods. Some of these had been worshiped from ancient times when the country had not been united. For each of these gods there were priests. In the course of time the priests became rich and powerful. They, like the Pharaoh and the nobles, owned large tracts of land on which the common people did the work.

Most of the Egyptians, however, were poor. They cultivated the land, toiling early and late to produce riches for the owners of the land.

Almost the whole population, then, belonged either to the ruling class or to the farming class.

Work Became "Specialized"

Even in ancient Egypt, however, the people were engaged in many special occupations. There were a few whom we should call professional. The scribes (writers), the physicians, the dentists, the engineers, were among these. There were other occupations which are sometimes called trades.

In an old Egyptian book a father, advising his son to become a scribe, describes some of these trades. He says:

> Now take the worker in metals. . . . The coppersmith has to work in front of his blazing furnace, his fingers are like the crocodile's

> legs. . . . The metal engraver works like a ploughman. The mason is always overhauling blocks of stone, and in the evening he is tired out, his arms are heavy and the bones of his thighs and back feel as if they were coming asunder. The barber scours the town in search of customers; at the end of the day he is worn out, and he tortures his hands and arms to fill his belly. The waterman is stung to death by the gnats and mosquitoes, and the stench of the canals chokes him. The ditcher in the fields works among the cattle and pigs and he must cook his food in the open; his garments are stiff with mud. . . .
>
> The weaver is worse off than a woman. . . . The armourer is ruined by his expense. The caravan man goes in terror of lions and nomads whilst on his journey, and he returns to Egypt exhausted. The reed-cutter's . . . eyes are dull and lifeless, and he works naked all the day long at cutting reeds. The sandal-maker spends his life in begging for work.[1]

Of course this father was trying to show how unpleasant those occupations were, but it does give us an idea of the kinds of workers in ancient Egypt.

"Recorded" History at Last, 3400 B.C.

Perhaps you have become a little impatient because we have not told you the names of kings and nobles and the exact dates when events took place. The reason we have not done so is that before 3400 B.C. there was almost nothing exact to tell. Recorded history (that is, an exact description of events and dates) appears only after that time — about 5300 years ago. Of the things that happened earlier our knowledge has come from the piles of bones, stone tools, pieces of pottery,

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[1] Papyri in the British Museum (Nos. 10182, 10222). From Sir E. A. Wallis Budge's *Dwellers on the Nile*, pp. 41–43. The Religious Tract Society, London, 1926.

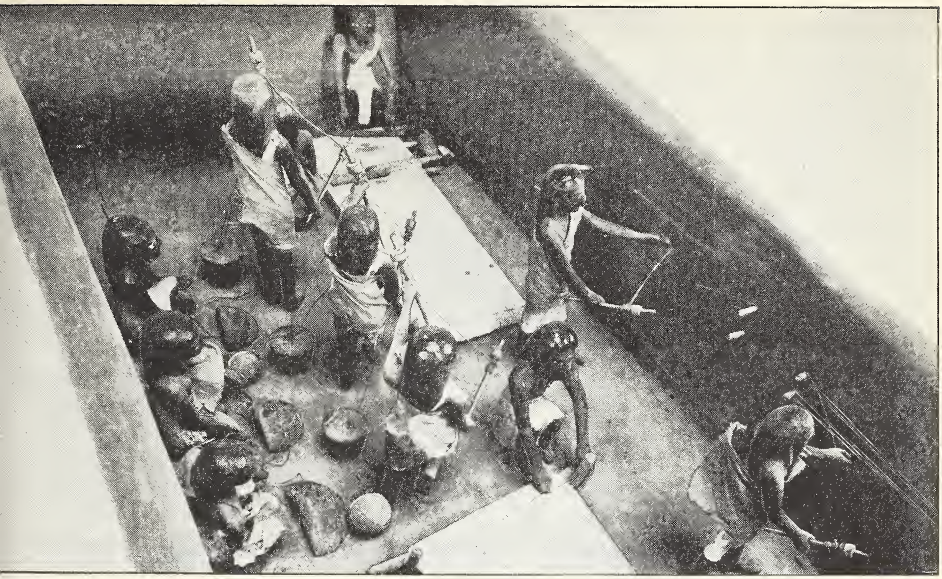
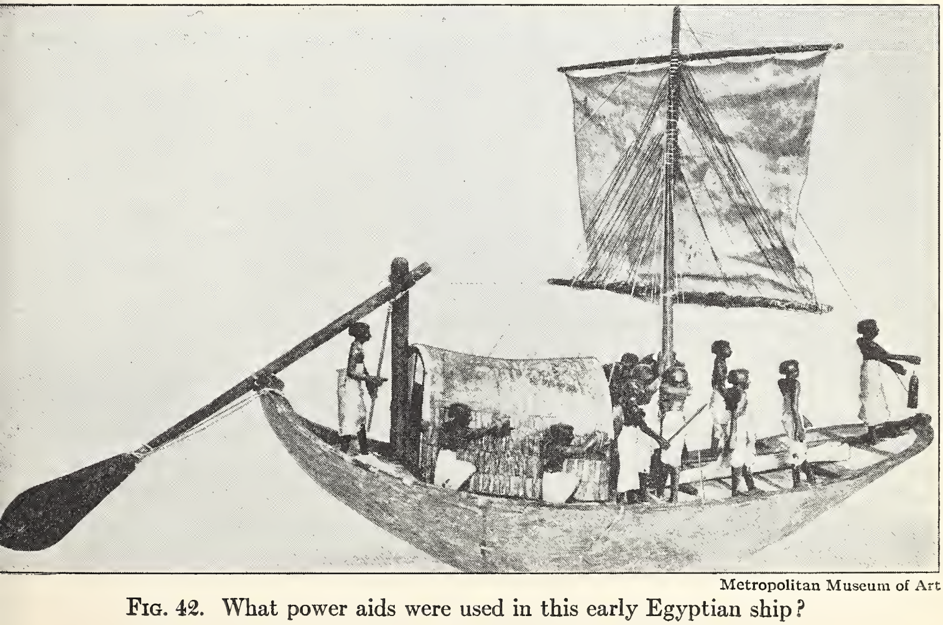


Fig. 41. In 2000 B.C. Egyptian women were spinning flax and weaving it into cloth in this way



Metropolitan Museum of Art

Fig. 42. What power aids were used in this early Egyptian ship?

and the like that were found in mounds and layers of earth. From these our scientists know only in a very general way when things happened.

A Picture Story of Written Records

After about 3400 B.C. written history begins. What are these written records?

Part of the ancient history of Egypt is written in stone. Are you astonished to hear that? What can it mean? It means that most things made of wood or clay have long since broken to pieces or been absorbed into the soil. But things of stone wear and wear, are not much changed by either the sun's rays or the rain during thousands of years.

Of course there are other kinds of written records. Among these are the following six:

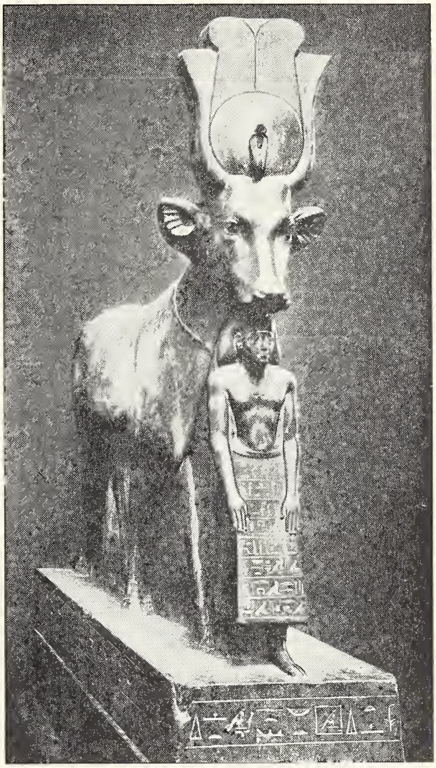
1. The great stone pyramids stretching over many miles along the banks of the Nile. They are the tombs of the kings of Egypt.
2. Stone houses buried long, long ago by the "sands of time," and recently discovered by the excavations of archaeologists.
3. The ruins of stone temples, such as Thebes and Karnak, covered with carved writing of different periods of history.
4. Pieces of sculpture and monuments with words carved on them, and paintings that tell of early history.
5. Mummies of kings and nobles, together with tools, implements, weapons, utensils, and models of things found inside great tombs recently excavated.
6. Papyrus rolls with ancient writing on them.

From such records as these Egypt's recorded history has been pieced together by our archaeologists — all within the last 40 or 50 years.

Egyptian History Started in the Nile Delta

The written history of Egypt begins in the delta, where the Nile River pours its waters into the Mediterranean Sea. You know from your earlier studies that a delta is the place at the mouth of a river where the waters have piled up soil and so formed many, many islands. Most great rivers of the world have deltas. The Mississippi River in the United States has piled up soil at the entrance to the Gulf of Mexico until now the delta is 200 miles across. Both the Mackenzie River in the Arctic Zone and the Amazon in the Torrid Zone have formed deltas. The Po River in Italy has built a delta 36 miles across, out into the Adriatic Sea.

So it was with the Nile. Year after year, century after century, the floods brought down large quantities of soil from the highlands in Africa. Most of the banks of the river for many, many miles became wet marshes. After the floods the water went down and left rich soil over the delta lands. How large it was



Metropolitan Museum of Art

Fig. 43. Egyptian hieroglyphics are shown in this sculpture of 3000 years ago

then, we do not know. Today the Nile delta is a huge area of rich farming land 12,000 square miles in extent!

It was in this region of the delta rather than farther south that the first farming communities grew. It was here that the irrigation engineers became chieftains. It was here also that the most powerful of the chieftain nobles became the Pharaohs.

The Kingdom of the First Union, 4300 B.C.

About 6000 to 7000 years ago the lands along the Nile were ruled by two kings. There was one in the south of Egypt — in the higher lands of the Nile valley — who wore a white crown. There was another in the north of Egypt — at the delta of the Nile — who wore a red crown. Archaeologists are not sure of the dates, but they think that about 4300 B.C. the king of the delta region conquered the king of the southern highlands. Thus what is called the "First Union" began. From that time on all Egypt was ruled by one Pharaoh at a time. He wore the combined crown of the two lands.

Great and mighty was Pharaoh, with tremendous power over the lives of his subjects. He came to be considered a god.

Many Inventions Came under the First United Kingdom

The Invention of Plows and the Use of Oxen

It is thought that in this period of the First Union — about 4000 B.C. — the Egyptians, perhaps tired of the backbreaking job of hoeing the soil, got the idea of the plow. Archaeologists have found many sculptures and pictures which show that plows drawn by oxen were in use as early as that. Can you see how the change from hoe-farming to plow-farming increased very greatly the amount of land that could be cultivated by a single farmer? You can see, then, what a better living the people could have in Egypt after that.

The Invention of Writing; Ink and Paper

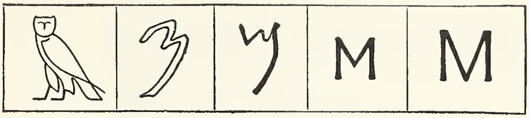


Fig. 44. How our letter M may have grown

From the study of *Man at Work: His Arts and Crafts*[1] you know that the New Stone Age peoples in many regions of the earth invented ways of writing by drawing pictures. Figure 43 shows us an example of this ancient Egyptian picture-writing that archaeologists think was invented in the time of the First Union. As you know, it was very difficult to send messages that could be understood, or to give exact records by picture-writing. Slowly the Egyptians learned to speak more clearly. As this happened, they learned to write their ideas more clearly. Sometime in this period clever men among them invented the use of "idea signs," or hieroglyphics. The pictures of birds, animals, people, grasses, and the like were abbreviated by writing only certain strokes. Figure 44 shows us, for example, how scientists think our letter *M* slowly (over thousands of years) grew out of the picture of a bird as the Egyptians drew it long ago.

About the same time other clever people invented ink and paper. Ink was made by mixing vegetable gum in water and blackening the mixture with soot. Paper was first made by splitting the pith, or inside, of the long stems of the papyrus plant, a reed that grew along the Nile. The workmen soaked, pounded, scraped, and pressed layers of this into thin sheets. These sheets were wound up into rolls, or scrolls, and became "books" from 10 to 12 inches wide and from 10 to 200 feet long.

Thus the years of the First Union passed, with Egyptian civilization advancing in many ways.

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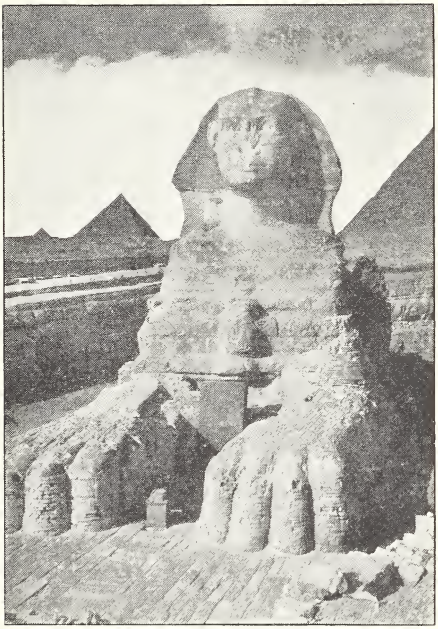
[1] You will find the story in Chapters XVII and XVIII.

King Menes Joined All Egypt in the Second Union, 3360 B.C.

Slowly, however, the two regions of the kingdom fell apart and were again led by separate rulers. Then about 3360 B.C. came the Second Union, under the rule of King Menes, who joined Upper and Lower Egypt. This is the earliest date of a named king of whom we have any record.

It was during his reign, archaeologists think, that very fine copper tools were invented. With these tools stones could be cut so that their sides and edges were smooth and sharp. And so it was probably at this time that the Egyptians accomplished their great building.



Ewing Galloway

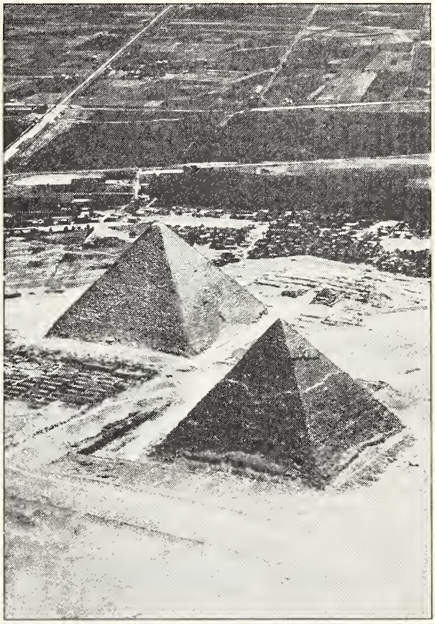
Fig. 45. The Sphinx — one of the best examples of Egyptian architecture

The Age of the Pyramids, 3000–2500 B.C.

If you were to take an airplane at Cairo and fly up the Nile valley for 400 miles, you would look down on the greatest stone record of all history. The landscape — the great river and the broad expanse of sand desert — is broken by the most amazing stone structures.

"The pyramids!" you exclaim at once. Exactly. What boy or girl in any country today has not heard of these great structures that were built so many hundreds of years ago?

The pyramids were the giant tombs in which the bodies of the kings of Egypt were buried during the 500 years from about 3000 to 2500 B.C. For this reason that part of Egyptian history is called the Age of the Pyramids.



Ewing Galloway

FIG. 46. Some of the great pyramids built along the Nile many thousand years ago. How do they show that the Egyptians knew much about design in architecture?

From the excavations of the archaeologists it is known almost exactly when the pyramids were built. As late as 3300 B.C. the kings were being buried in graves dug in the sands of the desert near Cairo. These graves were lined with bricks of sun-baked clay.

About 300 years later Khufu was Pharaoh of Egypt. Khufu had thousands of slaves and skilled artisans at work on the Great Pyramid of Giza. Giza is the ancient royal cemetery, and it is situated just outside the city of Cairo. Figure 46 shows the two larger pyramids in which the kings were buried.

Power Aids Were Then in Use

The enormous stones of the pyramids had to be cut on exact lines, with sides that would fit together perfectly. It seems clear that by this time very fine tools must have been

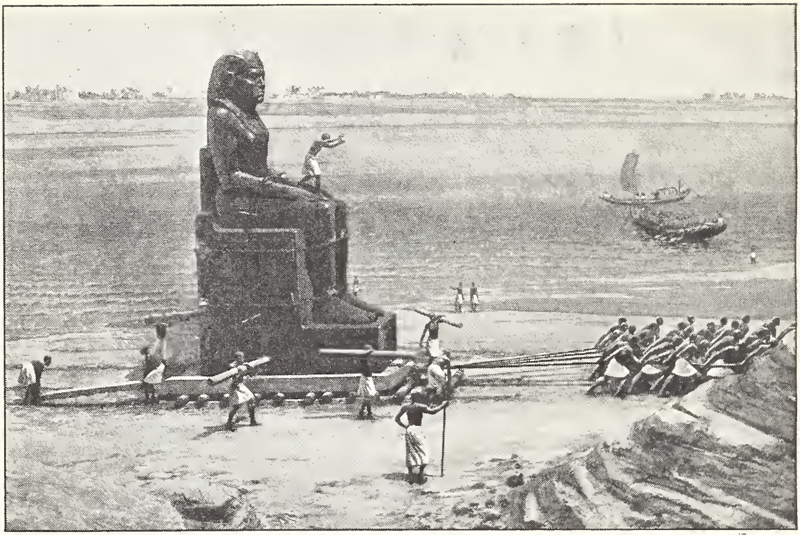


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Fig. 47. What power aids were the Egyptians using when they moved this statue down the Nile?

in use. The sides of the pyramids are exact triangles and the bases and single stones are squares; so we feel sure that the Egyptians knew a great deal about measurement and about geometry by 3000 B.C.

Because of the enormous weight and size of the blocks of stone — they were six feet high and weighed 5000 pounds each! — the Egyptians must have learned by that time how to invent and use such power aids as:

1. The lever and the fulcrum
2. The roller and the inclined plane
3. The wedge
4. The pulley
5. The windlass

These, then, are the kinds of things the Egyptians knew by 3000 B.C. Not only was it an Age of Pyramids, it was even more an Age of Invention. This was the time when civilization itself was developing!

Books You Would Like To Read

ALLEN, N. B. Our Cereal Grains. Ginn and Company, Boston.

CHANDLER, A. C. Magic Pictures of the Long Ago. Henry Holt and Company, Inc., New York.

CHANDLER, A. C. More Magic Pictures of the Long Ago. Henry Holt and Company, Inc., New York.

CHASE, A. E. and CLOW, E. Stories of Industry, Vol. II. Educational Publishing Company, Chicago.

GEORGE, C. L. How the World Is Ruled. Thomas S. Rockwell Co., Chicago.

KELLY, R. T. Egypt and the Holy Land. The Macmillan Company, New York.

MOHR, L. M. Egyptians of Long Ago. Rand McNally & Company, Chicago.

NATHAN, Mrs. A. G. The Farmer Sows His Wheat. Minton, Balch & Company, New York.

PERRY, W. S. With Azir Girges in Egypt. Mentzer, Bush & Company, Chicago.

SCALES, Mrs. L. W. Boys of the Ages. Ginn and Company, Boston.

WELLS, MARGARET E. How the Present Came from the Past (2 vols.). The Macmillan Company, New York. See especially Vol. II for ancient-history peoples.

WHEELER, I. W. Playing with Clay. The Macmillan Company, New York.

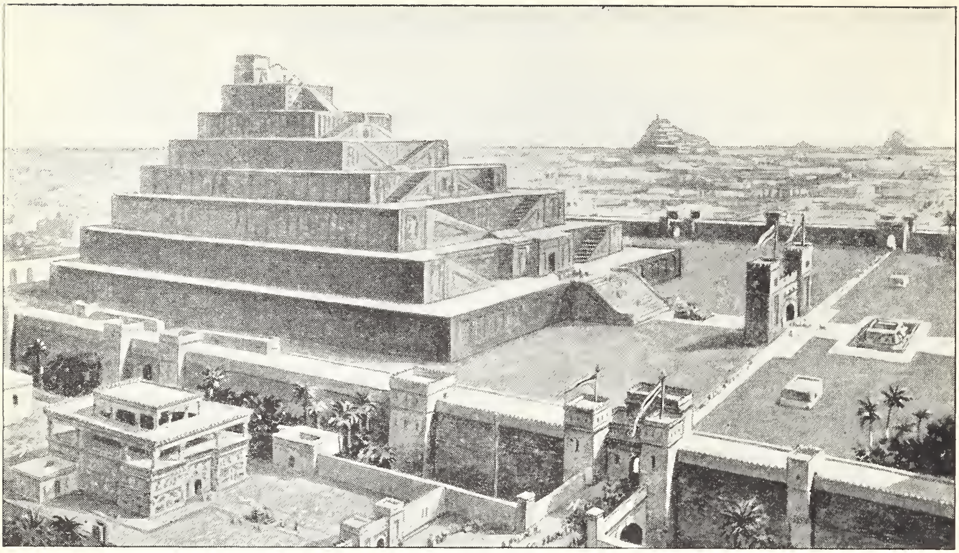
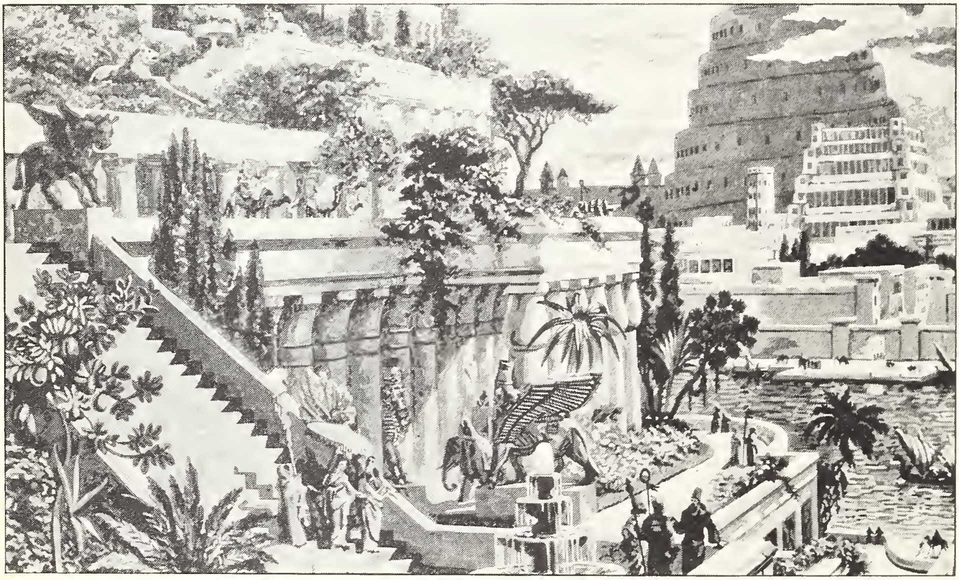


Fig. 48. This huge temple tower shows the religious architecture of the Babylonians



Ewing Galloway

Fig. 49. What do these hanging gardens of Babylon tell you about Chaldean civilization?

CHAPTER VIII

Mesopotamia: Another Cradle of Civilization

Were there two civilizations growing up side by side in the fertile river valleys at the east end of the Mediterranean Sea? Some scholars think so. They say that while the Hamites, the white peoples of the Nile valley, were inventing farming and tools, architecture and government, another white people, called Semites, were building a civilization in the valley formed by the Tigris and Euphrates rivers. This was the civilization of Mesopotamia.

The Glory of Babylon

One historian of art has praised the glory of Babylon, that great city of Mesopotamian life, in these words:

> Superb cities, temples and palaces of unheard-of luxury . . . from black to gold, white, purple, blue, vermilion, silver, the seven storeys add variety to the ascent of the tower . . . the towers gleam like enamels in the flames of the sun . . . glazed bricks . . . friezes of figures in relief, the glittering treasure of the miners' toil, cunning workmanship in iron, silver and bronze . . . an extravagance of jewels, embroideries, fringed robes, precious stones . . . furniture resting on pedestals . . . palaces on basements, a glory of tapestries, the famous ancestors of the Oriental carpets.[1]

This was Babylon, one of the great cities of Mesopotamia. What a great advance man had made in ways of living since the closing years of the New Stone Age! Not even Egypt in all its glory could be described in more glowing words. Does this mean that there were two cradles of civilization instead of one? One in Mesopotamia, in addition to the one of the Nile valley? Was there another fertile river valley in which people settled down long, long ago? Let us see.

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[1] Adapted from Paul Lorquet's *L'Art et l'Histoire,* pp. 205–213. From L. J. Delaporte's *Mesopotamia,* p. x. Alfred A. Knopf, New York, 1925.

Mesopotamia: The Valley of the Two Rivers

There is no country called Mesopotamia. There never has been. The word *Mesopotamia* comes from two Greek words: *mesos*, meaning "middle," and *potamos*, meaning "river." This is the name that has long been given to the fertile valley of two rivers, the Euphrates and the Tigris. Find them on map 7, rising in the high mountains of Turkey and flowing down into the Persian Gulf.

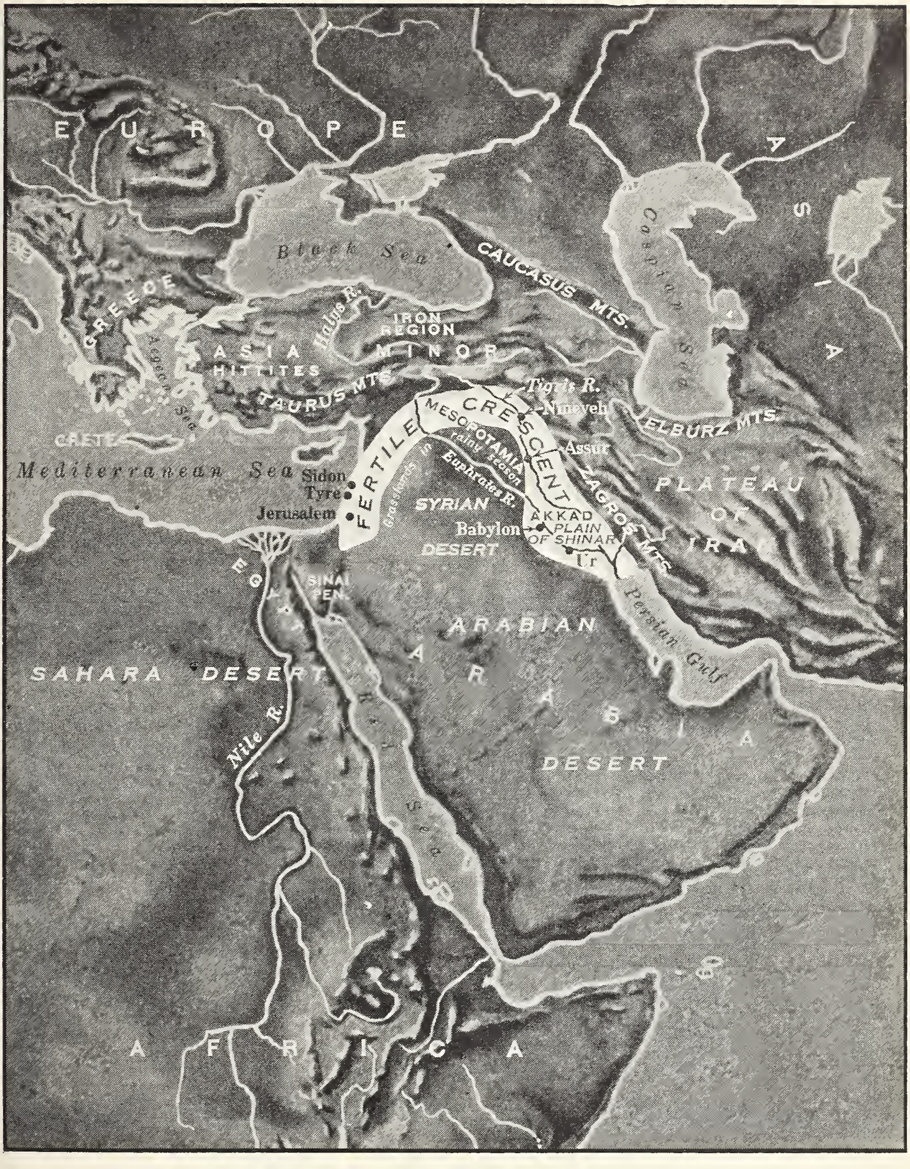
The valley stands out very clearly against the lands around it. How sharply it is bounded on four sides:

> On the *east* by the high mountain plateau of Iran.
> On the *west* by the vast desert of Syria.
> On the *north* by the Taurus and Anti-Taurus Mountains.
> On the *south* by the Persian Gulf.

This, then, is Mesopotamia. Although it is only from 100 to 200 miles wide and some 600 miles long, it has been one of the famous river valleys of the world.

The Annual Floods Bring New Soil as Well as Water for Irrigation

As the snows in the northern mountains begin to melt in the spring, the Euphrates and Tigris rivers, like the Nile, rise suddenly, almost without warning. The little streams pour their water into the large rivers. Faster and faster the flood



Map 7. The Near East — Mediterranean region

moves. As the water travels on toward the Persian Gulf, it carries with it rich materials from the surface of the hills and valleys. Finer and finer these materials are crushed and pulverized. At last the flood rises to the top of the banks and spreads out over the land. For some time it settles there, leaving a new layer of what is called alluvial soil.

Today the two rivers join and form one great stream about 100 miles from the Persian Gulf. By the time the flood reaches here, it is carrying an enormous amount of soil. Steadily this piles up, higher and higher. At last it rises out of the water, forming new land near the mouth of the river. As the crest of the flood pours into the Persian Gulf, the waters slowly fall until finally they drop below the level of the banks. By the time summer comes the river is again moving slowly and calmly on its way to the sea.

The Rich Plain of Shinar

More than 5000 years ago New Stone Age peoples settled on this plain that had slowly been built on the shore of the gulf. They called it the Plain of Shinar. Later — much later — it was to be known as the Plain of Babylonia.

A French scientist describes the southern part of the land as he thinks it must have been in those early days. He says:

> The soil, of extreme richness and always moist, was covered with tamarisks, willows, acacias and date palms. There were wild glades where grew cereals [wheat, barley, and oats]. The lagoons [lakes], quite shallow and muddy, were edged with gigantic reeds, and choked with aquatic [water] plants. These were breeding places for immense numbers of fishes and clouds of waterfowl. It is here in this privileged region, surrounded by deserts on every hand, that the Orientals placed the terrestrial paradise.[1]

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[1] J. de Morgan, *Les Premières Civilisations*, p. 179. From L. J. Delaporte's *Mesopotamia*, p. vii. Alfred A. Knopf, New York, 1925.

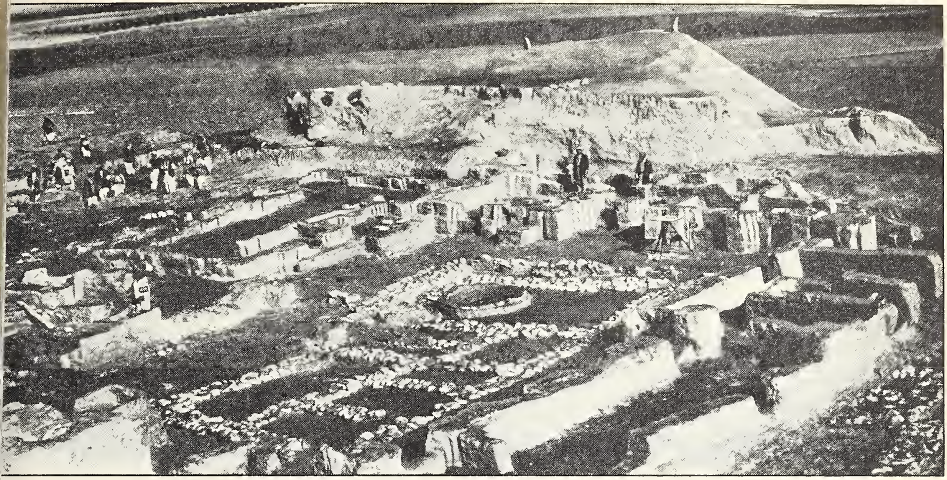
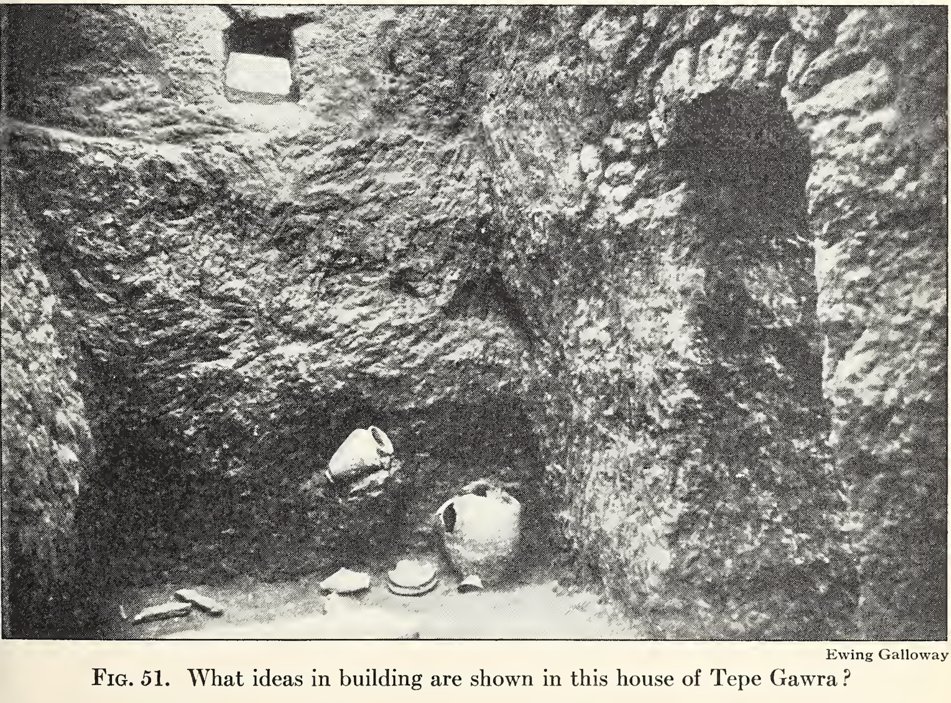


FIG. 50. While this book was being written, the village of Tepe Gawra was uncovered in Mesopotamia (in what today is Iraq). Some scientists believe that civilization existed here 2000 years before it had developed in Egypt



Ewing Galloway

FIG. 51. What ideas in building are shown in this house of Tepe Gawra?

The Desert Plateau of Arabia

The French scientist was describing this region well when he said that it was privileged. It was indeed especially favored by nature. To the southwest of this fertile land, pressing all the way across the Arabian peninsula, is an enormous desert. Most of it is a high plateau, two thirds of it from 2000 to 4000 feet above sea level, with certain spots rising to a height of from 8000 to 10,000 feet. The eastern quarter, bordering on the Persian Gulf, is low land not much above sea level.

In the Arabian Desert live the Bedouins. These people are nomads, wanderers. Their lives depend chiefly on the camel. The desert people, all the way from western Sahara in Africa to the Gobi of eastern Asia (7000 miles) ride on camels. They drink camel's milk. They eat camel meat. They wear camel's-hair clothes. They sleep under camel's-hair tents. Their very lives depend on the camel.

"And what do the camels eat?" They eat the grass around the water holes and in other places on the desert where it grows up quickly after a shower. It is said that when two Bedouin Arabs meet in the desert, one always greets the other by asking, "Has rain fallen where you have come from?" If the answer is "Yes," it is very likely that the first Arab will take down his tents, pack them on his camels, and start in the direction of the place where the shower has fallen. He knows that in such a place seeds will sprout quickly under the hot sun and that within a few days rich, wet grass will grow. There the camels can feed and feed. Often the grass is so moist that the camels do not even need water to drink. Of course this grass will not last very long. The desert is so hot and dry that it soon withers and dies. Then the desert nomad must again pack up his belongings and move on toward the next water hole or another place where showers have recently fallen.

Think of the Whole Eastern Mediterranean as a Single Region

If you look beyond the Arabian Desert to the west you will see that in the vast region stretching from just beyond the Nile valley to Iran, only two places stand out as fertile and low. Indeed, there are only two great oases in the vast desert that stretches 3500 miles from the Atlantic Ocean across Africa and Arabia to Iran. One is the great Nile valley, which we have studied; the other is Mesopotamia and a semicircular band of land that continues on from it to the east shore of the Mediterranean Sea. The rest of the land is the dry, sandy plateau of Arabia, the high mountains of Asia Minor, or the high plateau of Iran.

For over 1000 years this area has been called by the Europeans the "Near East," reserving the name of the "Far East" for India, China, Japan, and the surrounding lands. Even today we call this region of Iran, Iraq, Turkey, Syria, Palestine, Arabia, and Egypt the Near East.

Remember it, then, in all your studies as one region 1000 miles on a side and 1,000,000 square miles in area. Locate it on map 7 on page 149 from the Nile valley to Iran; from Asia Minor to the Persian Gulf and the Arabian Desert. No other place on the earth has been more important in the ancient history of mankind.

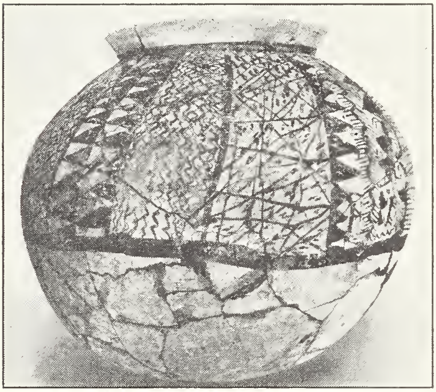
This Whole Eastern Mediterranean Region Was the "Cradle of Civilization"

This eastern Mediterranean region does, indeed, deserve the name "Cradle of Civilization." It was here — 6000 or more years ago — that New Stone Age people settled down and built up new ways of living that we call civilized. Whether it happened first in Egypt, then spread north and east to

Mesopotamia, or the other way round, is not so very important. What is important is that in both the river valleys advanced ways of living began at somewhat the same time.

In the "Fertile Crescent" Arose the Mesopotamian Civilization

Just as in the story of Egypt, the geography of the Tigris-Euphrates valley helped to decide where the civilization was to begin. Notice the spot which stands out on map 7 — a broad half circle in shape, 1000 miles long, and from 100 to 200 miles wide. It starts from the head of the Persian Gulf on the east, following northwestward along the Tigris River about 500 miles to the Taurus Mountains. Then it bends around the north end of the Arabian Desert and stretches along the coast of the Mediterranean to the bend at the Sinai peninsula.



Ewing Galloway

Fig. 52. One of the bowls found in Tepe Gawra in northern Iraq

Professor James H. Breasted, the famous archaeologist who dug up many relics of the civilizations of Egypt and Mesopotamia, named it the "Fertile Crescent." He called it "crescent" because it resembles the shape of the new moon. He called it "fertile" because of its rich soil.

Surrounded on all sides by sandy desert with almost no rainfall, or by rugged mountains where animals can graze but where it is difficult to raise cereals, the crescent stands out as a huge agricultural oasis. Water was at hand in the rivers for irrigation. The climate (about 30° to 36° north latitude) was favorable. Crops could be raised there. People could settle down and build farms and villages, even towns and cities. Notice on the map too that in addition to the farming lands, there is a wide band of grasslands in the rainy season. Here, each year, the grass flourished for a short time, and the Arab herdsmen drove their animals north to feed upon it.

In short, the geography was favorable for civilization.

Several Important Civilizations Arose on This Farming Crescent

It was upon this curved oasis in the desert that no less than five great civilizations grew up between 3000 B.C. and the time of Christ. Find them on the map.

1. Sumer, an advanced civilization by 3000 B.C., with its capital city at Ur.
2. Babylonia (on the Plain of Shinar), an advanced civilization by 2000 B.C., with its capital city at Babylon.
3. Assyria, an advanced civilization by 700 B.C., with its capital city at Nineveh.
4. Phoenicia, the trading civilization of the Mediterranean world by 1000 B.C., centered around the important cities of Tyre and Sidon.
5. Palestine, the Hebrew civilization by 1000 B.C., centered about Jerusalem.

A Sketch of the Story of Mesopotamia

To tell the complete story of Mesopotamia would require a whole volume. All we can do here is to give some of the important events. The story covers about 2500 years, beginning about 3000 B.C. and ending about 500 B.C. Most of it deals with the eastern part of the Fertile Crescent; that is, the valley of the two rivers. The second part — after about 1000 B.C. — is more concerned with the western part: Phoenicia, Palestine, and Syria lying along the Mediterranean seacoast.

The Civilization of the Sumerians and Babylonians on the Plain of Babylonia

It is known without doubt that 5000 years ago — by 3000 B.C. — white people were living in civilized ways at both ends of the Fertile Crescent. Along the Mediterranean coast on the west lived the Canaanites (who were among the ancestors of the later Hebrews). These people had houses of sun-dried bricks in walled towns. They raised food by cultivating the soil. In fact, they were doing most of the things which the Egyptians had developed 1000 years and more before.

At the eastern end of the Fertile Crescent, where the Tigris and Euphrates rivers empty into the Persian Gulf, was the paradise land called the Plain of Babylonia. Earlier than 3000 B.C. this had been the Plain of Shinar, but it was now named from a small town called Babylon.

On this plot of rich land lived a white people called Sumerians (from "Sumer," the name of their little territory). Where they came from, who their ancestors were, we do not know. Scientists think that they may have come down from the mountainous plateau of the north and the east.

It is thought that the people of Sumer were civilized even before they settled on the Plain of Shinar. They had gone through their New Stone Age somewhere else. By the time they reached this fertile land they were already an advanced people. They built towns on the high mounds out of reach of the flood waters. Each group had its own government and its own king. Their houses and temples were of sun-dried bricks. On irrigated fields outside the towns they raised

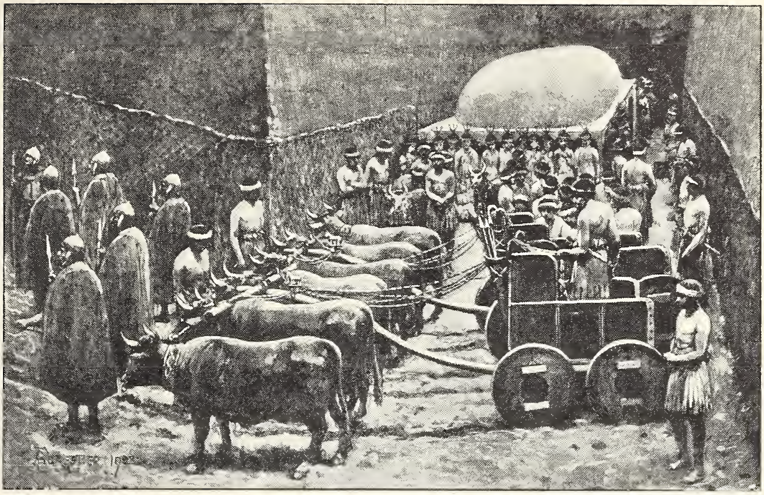


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Fig. 53. As an artist imagined the household of a prince of Ur waiting at the door of his tomb. What does the picture tell you of Sumerian civilization?

large crops of grain. They had flocks and herds. Moreover, they had learned to make ornaments, tools, and weapons of copper and bronze. They had learned how to keep records in writing. So, you see, these people had followed the same general path which the Egyptians had followed in building up their civilization.

There were some small differences, however, between the Sumerian civilization and that of Egypt. One of these was the way in which the farmers irrigated their fields. Large canals within reach of each farm were dug from the river. After the farmer had plowed his land and planted the seed, he divided the whole field into square or oblong patches. These were separated by low banks of earth. Channels were dug in the banks, and these were connected with the main irrigation stream.

When the plants needed water, the farmer blocked up the channel with dirt and broke a hole in the bank so that the water could flow over this field. When he had all the water he wanted in the field, he again filled the hole in the bank and opened the main irrigation canal so that the water would flow on. Other fields were watered in the same way. Sometimes, as in Egypt, the water had to be raised from a lower to a higher level. This was done with implements worked by oxen or with a system of pails. Thus a good supply of water could be provided whenever it was needed.

There were differences in ways of writing between the peoples of Egypt and those of Sumer. The scribes of Sumer did not write on papyrus, but on soft clay tablets which were later dried or baked. The writing was done with a tool called a stylus. When the stylus was pressed into the clay, it left a wedge-shaped mark. Certain patterns of these wedge-shaped marks represented syllables or sounds. Long before that, as in Egypt, these people had had picture-writing, but by 3000 B.C. they were using signs which meant sounds.

Wars among Sumerian City-Kingdoms

Perhaps the most important difference between the Egyptian and Sumerian civilizations was their history. The life of Egypt was peaceful; that of the Sumerians was broken by continuous wars.

Here, again, geography played its part. The lands around the two valleys were different in several ways. As you know, the Nile valley was surrounded by deserts, and few people can live in desert land. In order to do so at all, they must carry enough water for themselves and their camels to last from one water hole to another. They must carry food. For this reason there can be no large desert armies. Thus Egypt was well protected because though large numbers of warlike people lived beyond the deserts, it was too difficult to cross them. It is not hard to understand, therefore, that huge armies never invaded the fertile Egyptian farms.

The geography of the regions surrounding the Tigris-Euphrates valley, however, made the history of these people anything but peaceful. In fact, for thousands of years they were compelled to defend themselves against invaders from several directions. There were wars between the fierce mountain tribesmen of the north and the wandering herdsmen of the grasslands. There were wars between the nomad herdsmen and the farming peoples of the valley. The story of Mesopotamia is broken by wars and invasions. From century to century it is a story of shifting power from one part of the valley to the other.

The Walled Towns of Mesopotamia

In the centuries between 3000 B.C. and 2500 B.C. the Sumerians built a number of towns along the valley. In the center of each town beautiful temples were erected. These sometimes rose 150 feet above the mud houses of the people. There were smaller places of worship also. There were storehouses for grain and goods, and shops in which the merchants carried on their trade. The whole town was surrounded by a high mud wall for protection against invading armies.

The most famous of these Sumerian towns was Ur. As early as 2900 B.C. Ur was a flourishing city, ruled by Mes-anni-padda, the oldest known king of western Asia. Excavations of huge mounds along the Euphrates River, made not long ago by Sir Leonard Woolley, have revealed the ruins of the ancient city, with its many objects of art and sculpture, bookmaking, and the like.

The cities of Sumer were really kingdoms, ruled by a priest-king and nobles who owned the land around the walled towns. As in Egypt, most of the people were either slaves or farmers, or artisans in the towns. Each king was jealous of the others. For a time Ur was the most powerful city of all.

The People of the Fertile Crescent Were Semites

As centuries passed, the mountain tribesmen who had come down from the north to attack the Sumerian towns began to settle there. The desert nomads from the west and south also crowded into the Plain of Babylonia. All these were white peoples called Semites. It is important to remember the Semites, because we shall hear more about them. There seems to be little doubt that they and the Hamites (Egyptians and others in Africa) built up these two early civilizations. The Semites built Babylonia, Assyria, Chaldea, Syria, and Palestine. Later the Phoenicians, who were also Semites, developed a trading empire that reached all the way round the Mediterranean Sea and even up the western coast of Europe. The Jews of today are descended from these ancient Semites.

Sargon I, King of Mesopotamia about 2500 B.C.

Some years before 2500 B.C. a tribe of Semites had settled at Akkad, along the valley of the Euphrates, north of Sumer. At first they lived in tents, as they had in the desert. They farmed the rich land in a crude way; but it appears that they knew little about civilized ways of living. They could not read and write. They had almost no arts and crafts.

By 2500 B.C. a brave leader named Sargon had risen among them. He and his rough, warlike people moved down the Euphrates River and conquered the Sumerian towns one by one. At last he became the ruler over the whole southern

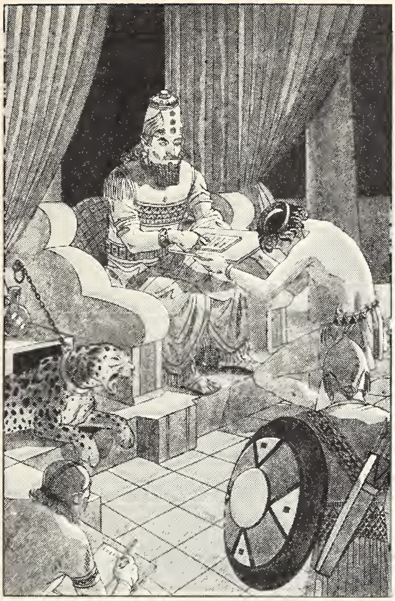
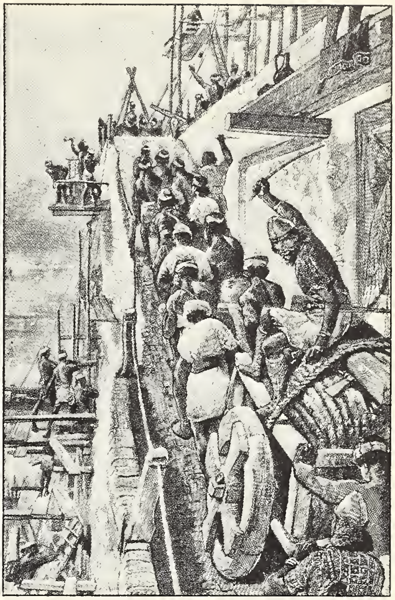


FIG. 54. The king of Babylonia sending a messenger on an errand in 3000 B.C. What does the scene tell you about the civilization of the Babylonians?



Ewing Galloway

FIG. 55. The Babylonians constructing a building in 2500 B.C. What does this picture tell you about the kind of labor the Babylonian leaders used?

valley and called himself King Sargon I. Here was the beginning of the first kingdom of the Semites, a kingdom which was to last for thousands of years.

After these Akkadian Semites had settled down, they learned to cultivate the land, to make and use tools and implements, and to erect structures. Slowly copying and changing the Sumerian way of writing (which it is thought had been copied from that of the Egyptians), they invented their own written kind of language. This was the beginning of the Semitic written languages, of which we shall hear more later.

Babylon Became Great under King Hammurapi, 1900 B.C.

Step by step, as centuries passed, these Semite herdsmen of the desert conquered the Sumerian peoples of the valley. Steadily they took over and improved the Sumerian ways of living. As they did so, civilization in Mesopotamia became more and more advanced.

About 2000 B.C. Hammurapi became king. It was he who made Babylon the most famous city of the known world. Before his time it had been an unimportant village. During his reign it became a capital of beautiful buildings, a rich center of all the civilized ways of the time.

King Hammurapi managed the affairs of the people in a very orderly manner. He gathered together all the laws and rules of the towns of Mesopotamia and combined them to make a famous code. We know about this today because his scribes carved these laws on a gigantic stone which has been preserved. Even today students in American law schools read this Code of Hammurapi.

Hammurapi helped trade and business as well. Even before his time, coins called shekels (a shekel was one sixtieth of a pound of silver, about like our ten-cent piece) had been used in some places. But Hammurapi decided that there should be one kind of money which he ordered everybody to use. This made buying and selling easier. With peace and order in the country, caravans of trade were able to go safely up and down the two rivers. Soon people on the northern and western sides of the Fertile Crescent began to trade with Mesopotamia. With trade went the spread of ideas and new ways of doing things. Because the merchants' bills were made out in the cuneiform writing of Babylon, these people learned to use it. Babylonian writing was copied far to the north and west, even as the people of Mesopotamia had copied the Egyptian. Steadily other ideas began to spread.

About 1900 B.C. Hammurapi died. The Babylonians were now without a strong king. Then the warlike tribes of the northern hills came down and conquered the Babylonian towns. After several hundred years had passed little remained of the magnificent civilization which had once been in the southern valley.

The Assyrians, Another Semitic People, Rose to Power

As far back as 2900 B.C. another Semitic civilization was beginning in the northern part of the Tigris valley, around a little place called Assur. Who the people were, of what tribes or races, we are not sure. We know only that they spoke a Semitic language and had probably descended from the desert Semites of Arabia.

The Assyrians Built a Great Empire

Perhaps this sounds astonishing, but little is known of these people for more than 1500 years. It is certain that they were constantly at war with the Hittites and other mountain tribesmen. Steadily they became better fighters, and as they did so the city-kings of Assur reached out for more and more territory.

Sometime between 1300 and 1100 B.C. their armies conquered the peoples along the north and west of the Fertile Crescent, even as far as Phoenicia and Palestine on the Mediterranean seacoast. As more and more territory was taken in, the land began to be known as Assyria, from the city of Assur. A great empire it became, too, reaching from the Euphrates westward to control the trade of the Mediterranean, as well as north and east into the mountain plateaus.

In the 700's B.C. the Assyrians, as they were now called, moved southward and conquered Babylon. Then all Mesopotamia became the Assyrian Empire. But that was not enough.

They continued on westward and southward along the Mediterranean until they had finally conquered Egypt. This was in 670 B.C. All the eastern Mediterranean was now theirs.

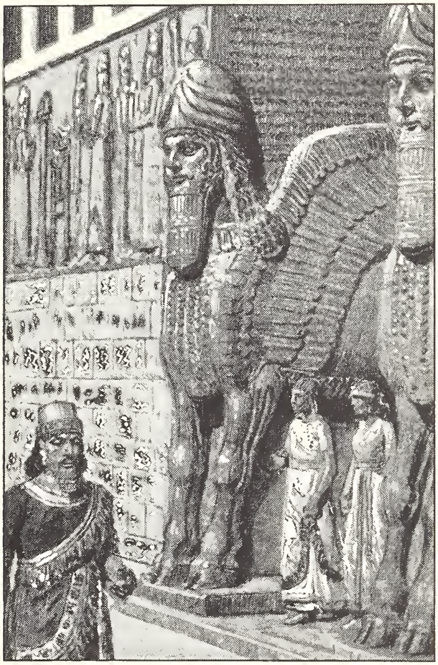


FIG. 56. A street in Nineveh gives you some idea of Assyrian art and architecture

Within a short time the Near East had become the trading crossroads of the world. Each year long camel caravans crossed the desert. Thousands of boats and ships traveled the two rivers, the Mediterranean Sea, and the Persian Gulf. Some went on toward India. Mesopotamia became the center of wealth for a great empire.

The kings of Assyria ruled "the world" of that day. One of these was an Assyrian prince who, remembering King Sargon I of 2500 B.C., took the name of Sargon II. Sargon II had a son called Sennacherib. During the reign of father and son a new capital city was built at Nineveh. Here the Mesopotamian civilization reached its height. In architecture these people were supreme, as the temples, public buildings, royal residences, bridges over the rivers, water-supply systems, and other structures prove. They invented the plan of using a series of arches one above the other, as the Romans did later.

The great-grandson of Sargon II, Assurbanipal, also became king (668–626 B.C.). He built a library at Nineveh in which were collected 22,000 tablets. On these tablets the students of Assyria had written down all that was known of the science and art, writing and religion, of the previous centuries. Many of these have recently been dug up from the deep ruins of Nineveh and are preserved in the British Museum in London. So far as we know, these tablets make up the most ancient library of Asia. From them we can learn much about how the people of the Near East lived 2500 years ago.

So, for a time, Assyria bound the whole Near East together, built up one single government for the whole land. It was an empire of trade and military strength, a center of wealth and learning and of art and practical knowledge. From it spread the new languages and arts all over the Mediterranean world.

But Assyria as an empire lasted only 150 years. By 612 B.C. its power had gone.

The Chaldeans Build an Empire about 600 B.C.

Now another Semitic people, the Chaldeans, were to take the place of the Assyrians. Once more the power went back to Babylon, for the Chaldean kings made that famous city on the Euphrates their capital. Under their most famous king, Nebuchadnezzar, they rebuilt Babylon and made it the most splendid capital of all ancient times.

The civilization of Mesopotamia had no pyramids, but its cities and palaces were in many ways more remarkable than those of Egypt. Around the city was a great wall to protect it against invading armies. So wide was this wall that at places two four-horse chariots could travel abreast on it. Within the city the finest of all the palaces was that built by King

Nebuchadnezzar. It was made of brick, like most of the buildings of the land. The brick walls of the court, however, were enameled in bright yellow and blue and white. Here it was too that the king built the famous hanging gardens, which are now considered one of the Seven Wonders of the Ancient World. Let Nebuchadnezzar himself describe his palace:

> I laid firm its foundation and raised it mountain-high with bitumen and burnt-bricks. Mighty cedars I caused to be stretched out at length for its roofing. Door-leaves of cedar overlaid with copper, thresholds and sockets of bronze I placed in its doorways. Silver and gold and precious stones, all that can be imagined of costliness, splendour, wealth, riches, all that was highly esteemed, I heaped up within it. I stored up immense abundance of royal treasure therein.[1]

Mesopotamian Civilization Was a Mixture of the Beautiful and the Ugly

As in Egypt there was another side to the picture, however. Among the people were slaves and poverty-stricken workers. There were wars, which meant starvation, the sacking of towns, the killing of citizens, the taking of prisoners. The Assyrian rulers were particularly noted for extreme cruelty in time of war. Altogether, the Mesopotamian civilization, like that of Egypt and those of later times, was a mixture of the beautiful and the ugly.

Summing Up: Egypt and Mesopotamia, Two Great Civilizations

And so, side by side, these two ancient civilizations grew near the Mediterranean. From times far back they had contacts with each other. Traders went back and forth along the

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[1] Leonard W. King, *A History of Babylon*, p. 40. Chatto & Windus, London, 1915.

Fertile Crescent exchanging goods. At times the kings of one land were ambitious to conquer the other, but at other times daughters and sisters of the kings of one land were sent to marry the kings of the other land.

Each country had a life somewhat different from that of the other. Both of them, however, had developed civilizations such as the world had never seen before at a time when our ancestors in Europe were still barbarians. These civilizations were to play a very large part in the story of mankind. Their influence was to spread around the Mediterranean and up into Europe. In later chapters we shall see how this happened.

First we must go to another ancient river-valley civilization — China.

Books You Would Like To Read

BONSER, EDNA. How the Early Hebrews Lived and Learned. The Macmillan Company, New York.

FRENCH, HARRY W. The Lance of Kanana. Lothrop, Lee & Shepard Company, Boston.

HODGDON, J. R. The Enchanted Past. Ginn and Company, Boston.

KENT, LOUISE ANDREWS. Two Children of Tyre. Houghton Mifflin Company, New York.

MILLS, DOROTHY. The Book of the Ancient World for Younger Readers. G. P. Putnam's Sons, New York.

MILLS, DOROTHY. The People of Ancient Israel. Charles Scribner's Sons, New York.

MOHR, L. M. Babylonia and Assyria. Rand McNally & Company, Chicago.

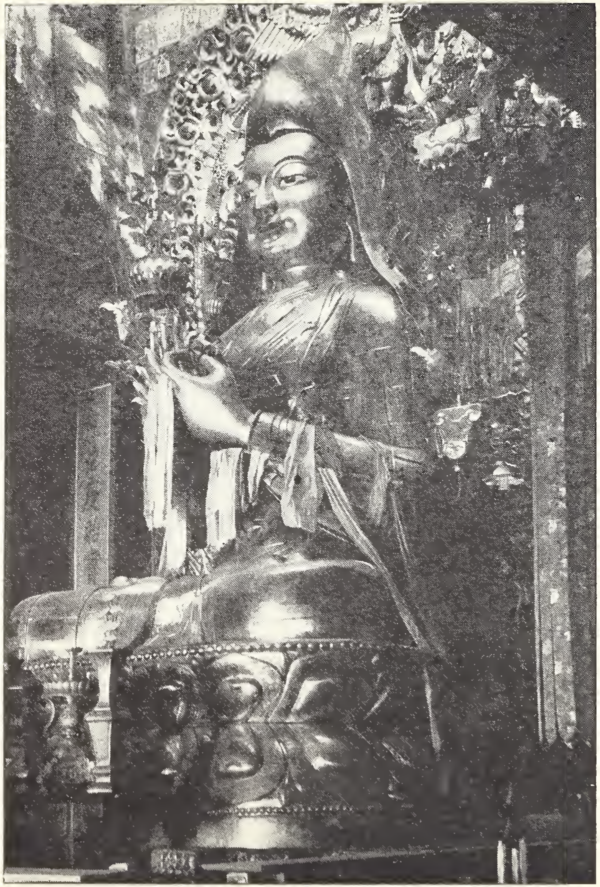
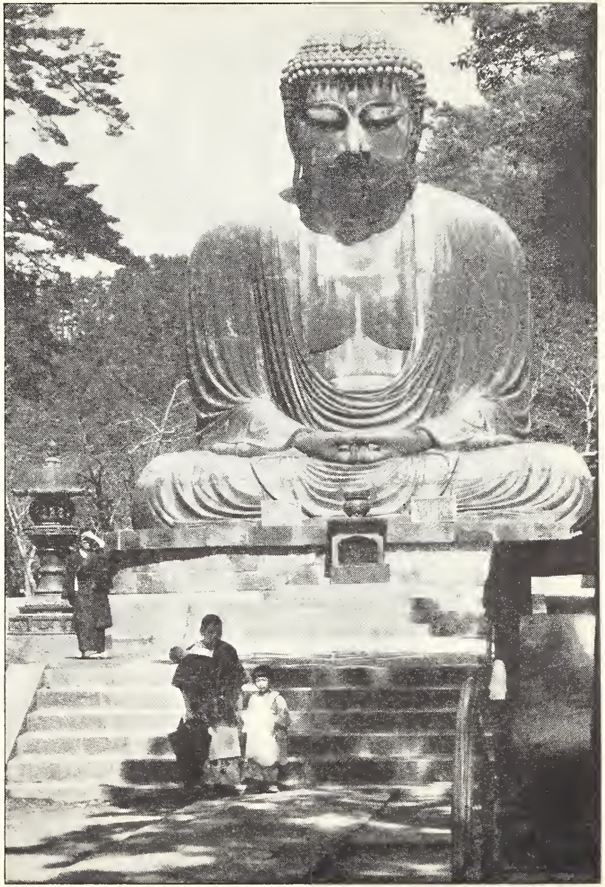


FIG. 57. The gold Buddha in the main prayer hall of the Loma temple in Peiping



Ewing Galloway

FIG. 58. The Great Buddha at Kamakura, Japan, shows how Chinese religious sculpture influenced the Japanese

CHAPTER IX

The Great Chinese Civilization: Another Cradle?

The Rise of Civilization in the Yellow River Valley

Geography Again!

The story of China, like that of Egypt and Mesopotamia, begins in a river valley. This time it is the Yellow River, which runs in a general easterly direction through the northern part of the country toward the sea. Down from the distant western mountains it rushes each spring as the snows melt, flooding the lands as it goes and leaving soil that is rich for farming. Throughout other seasons of the year a light rainfall of 20 inches is scattered over the valley. The climate in general is temperate, the valley being located at 34° to 40° north latitude. Here nature is indeed favorable to man; and it is here, along the bank of the river, that Chinese civilization began.

What We Know of Life before Written History

Those early days are not very clear to us. They are less clear than the early days of the Nile and Tigris-Euphrates valleys. What we know of them is told in the myths and legends of the Chinese people. As in the myths of all countries, however, there is some truth and some fancy, and it is hard to tell which is which.

In general they describe a life a good deal like that of Old Stone Age men in Europe. It would seem that this kind of wandering life was typical in many parts of the earth. People lived in caves or wandered about and built themselves shelters for protection from animals.

Finally they settled down in the rich Yellow River valley and learned how to till the soil. Just when this happened, we do not know; but probably it was not far from 3000 B.C., the time, you remember, when Egyptian civilization was reaching a high level.

The story goes that at this time also the Chinese were ruled by chiefs. Among these mythical chieftains were the "Three Divine Rulers." There was Sui Jen, Producer of Fire, who was said to have brought fire down from heaven. There was Fu-hi, Conqueror of Animals, who taught his people how to fish with nets, to catch animals for food and to tame them for use. It was he also, the Chinese believed, who invented the system of writing which was handed on to future generations. The last of these rulers was Shen Nung, God of Agriculture, who taught people how to do farming and how to use herbs as medicine.

Some time after the Three Divine Rulers came Huang Ti. During his rule the boundaries of the country were extended farther than they had ever been before. He is supposed to have reigned for a hundred years and to have done many things to help the Chinese people. We are told that he invented money and made up a system of weighing and measuring, as well as a calendar. He taught the people how to make pottery and utensils of wood and metal. He encouraged trading among the people, and even astronomy, the study of the stars. His wife too was honored by the Chinese as the one who taught them how to raise silkworms and to weave silk.

Of course these rulers may never have lived. If they did, it is more than likely that they were not as wise as the myths claim. The work of any one of them is probably the result of the inventions of many, many thinking leaders.

The legends do show, however, that several thousand years ago, perhaps between 3000 and 2000 B.C., the people of China were developing a civilization. We can be certain that the land was being cultivated by industrious farmers who were raising not only grains but mulberry trees. There must have been silk-making, for it is upon the leaves of the mulberry tree that silkworms feed. People had learned to domesticate a number of different animals, among them the horse, the dog, the ox, the sheep, the pig, and the fowl. Towns were growing and trade was thriving. Metals were coming into general use. The writing, which began as pictures, just as that of other civilizations, was changing into real writing.

Moreover, there was a government with chiefs at the head. And these early rulers were not emperors who ruled harshly and severely; they were leaders, guiding the people in the arts of peace and industry. This is a poem, supposed to have been written by one of them:

> When the members work joyfully
> The Head rises grandly;
> And the duties of all the offices are fully discharged;
> When the Head is intelligent
> The members are good,
> And all affairs will be happily performed.[1]

There is another legend which tells of the attempt of one emperor to stop the floods, which were washing away the crops. As you know, China is a land of rivers. In addition to the big ones which are shown on the map, there are numberless small ones flowing into them. In the spring they overflow their banks and flood the land far and wide. Throughout the history of China these floods have always caused terrible suffering among the people.

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[1] Herbert Gowen, *An Outline History of China*, Part I, p. 31. Sherman French Co., Boston, 1913.

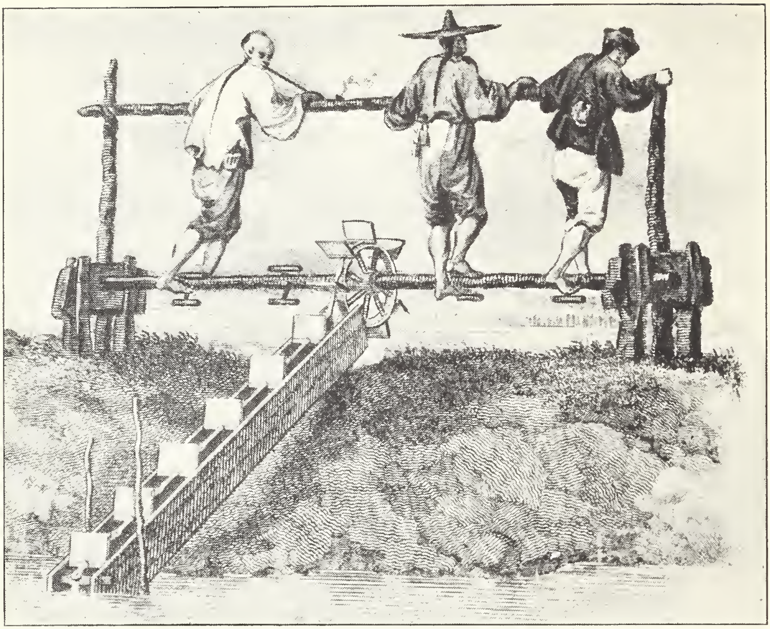

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FIG. 59. Like the Egyptians the Chinese invented simple power aids to irrigate the land. Can you tell how this one works?

According to the story a flood began in 2297 B.C. and lasted for thirteen years. The emperor was deeply grieved over the trouble which had come to his people, so he appointed a man by the name of Kun to undertake the task of stopping it. Kun built high mud walls in an effort to keep out the water. But these were washed away as the rivers rose higher and higher. For his failure Kun was put to death. Then the emperor appointed Kun's son, Yu, to carry on the work. Yu followed a different method. He dug out the beds of the rivers and cut new channels to carry away the water. The story goes that this plan was a great success, and even today the people of China say, "We would have been fish but for Yu."

Except through such legends as these, very little more is known about China until about 800 B.C. From that time on, there are written records.

CHINA AT THE BEGINNING OF THE HISTORICAL PERIOD

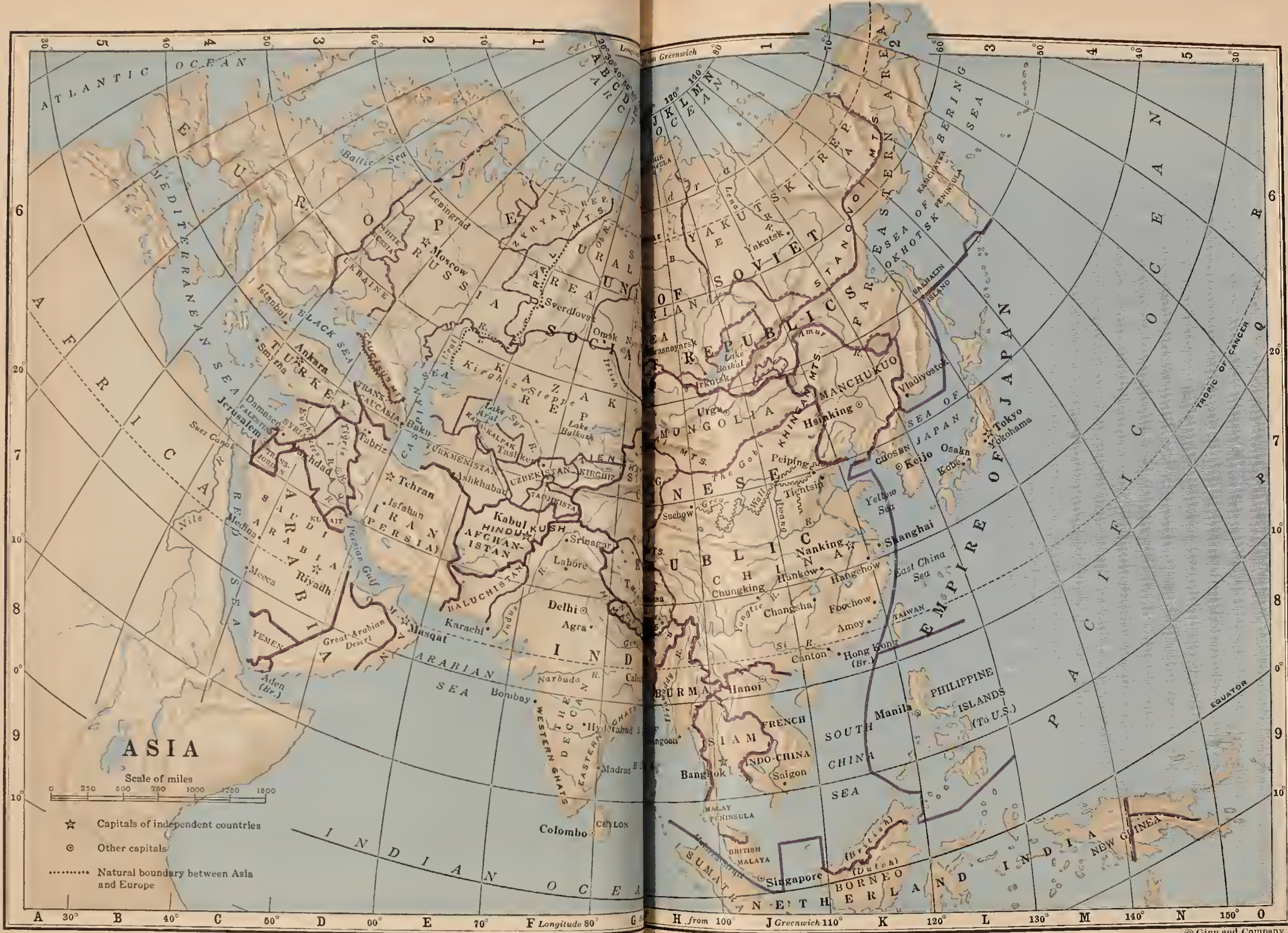
Why We Know Very Little about Ancient China

Does it seem strange to you that there are so few records of how Chinese civilization developed when so much is known of Mesopotamian and Egyptian civilizations of even earlier times? There are two important reasons for this. In the first place, fewer studies have been made in China by the archaeologists. There is much more work to be done. In the second place, the old Chinese records did not last through the centuries, as did those of the Babylonian and the Egyptian. You remember from *Man at Work: His Arts and Crafts* that early Chinese writing was done on pieces of bamboo. Wood, as you know, decays quickly. Babylonian writing was done on tablets of clay, which lasts longer than wood. Many of the Egyptian records were made on stone, which, of course, lasts for thousands of years. We may never know as much about ancient Chinese civilization as we do about the Mediterranean civilizations because the records have been destroyed.

Chinese Civilization Was Marvelously Advanced in 800 B.C.

When we look at China in 800 B.C. (2700 years ago) we find the Chou dynasty, or family of rulers, governing the people. This dynasty lasted almost 900 years — from 1122 B.C. to 255 B.C., longer than any in history except that of the present Japanese rulers.

A traveler from Egypt or Mesopotamia to China in those years would have thought this Far Eastern land quite different



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in some ways from that which he had left behind. Instead of the tan-skinned people of the Mediterranean region he would have seen people with rather yellowish skin, straight black hair, and slanting eyes. He would have seen the silk robes of the nobles and the cotton garments of the poor. Palaces and temples were made of wood rather than of stone or brick. And the speech of the people might have seemed strange, indeed.

But there was much in China which would have reminded him of the Mediterranean civilizations. Most of the people were farmers tilling their fields, or workmen making things by hand, or merchants and traders in the shops. They raised grain, mulberry trees, and silkworms. They spun and wove silk, carved wood, built carriages, and erected houses and temples. They brought products from the fields and sold them in the markets of the villages and towns. These were the common people, who carried on the busy work of the land.

The noble classes consisted of large families who owned and ruled over huge tracts of land. It was they who appointed students and scholars to be the officials of the government. In many cases they were very powerful in the government. It is not easy to imagine that most of the people who held office in the government were the most highly educated men from the universities, but such was the Chinese plan. The nobles and the scholars were the ruling classes of the country.

Highest of all was the emperor. During the latter centuries of the Chou dynasty his power became weak, and the nobles who ruled over various sections of the country — that is, separate states — far surpassed him in strength. Nevertheless the emperor was still thought of as the father of all China.

The ruling classes of China, like the ruling classes of the lands around the Mediterranean, were surrounded by luxury and beauty. For them the most expert craftsmen made ornaments of gold and silver and rare stones. For them silk gar-

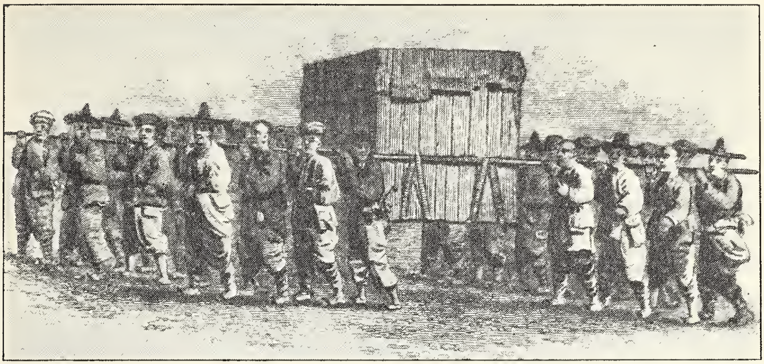

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Fig. 60. Early transportation in China

ments and hangings were woven; for them gardens of flowers and flowering trees were planted. A poet of the 300's B.C. has given a picture of the difference between the life of the nobles and the life of the common people.

Hsiang, king of Ch'u, was feasting in the Orchid-tower Palace, with Sung Yü and Ching Ch'ai to wait upon him. A gust of wind blew in and the king bared his breast to meet it, saying: "How pleasant a thing is this wind which I share with the common people."

Sung Yü answered: "This is the Great King's wind. The common people cannot share it."

The king said: "Wind is a spirit of Heaven and Earth. It comes wide spread and does not choose between noble and base or between high and low. How can you say 'This is the king's wind'?"

Sung answered: "I have heard it taught that in the crooked lemon-trees, birds make their nests and to empty spaces winds fly. But the wind-spirit that comes to different things is not the same!"

The king said: "Where is the wind born?" and Sung answered: "The wind is born in the ground. It rises in the extremities of the green p'ing-flower. It pours into the river-valleys and rages at the mouth of the pass. It follows the rolling flanks of Mount T'ai and dances beneath the pine-trees and cypresses. In gusty bouts it whirls. It rushes in fiery anger. It rumbles low with a noise like thunder, tearing down rocks and trees, smiting forests and grasses. . . .

"It is this cool, clear Man-Wind that, freeing itself, falls and rises till it climbs the high walls of the Castle and enters the gardens of the Inner Palace. It bends the flowers and leaves with its breath. It wanders among the osmanthus and pepper-trees. It lingers over the fretted face of the pond, to steal the soul of the hibiscus. It touches the willow leaves and scatters the fragrant herbs. Then it pauses in the courtyard and turning to the North goes up to the Jade Hall, shakes the hanging curtains and lightly passes into the inner room.

"And so it becomes the Great King's wind." . . .

The king said: "You have well described it. Now tell me of the common people's wind."

Sung said: "The common people's wind rises from narrow lanes and streets, carrying clouds of dust. Rushing to empty spaces it attacks the gateway, scatters the dust-heaps, sends the cinders flying, pokes among foul and rotting things, till at last it enters the tiled windows and reaches the rooms of the cottage. Now this wind is heavy and turgid, oppressing man's heart. It brings fever to his body, ulcers to his lips and dimness to his eyes. It shakes him with coughing; it kills him before his time.

"Such is the Woman-Wind of the common people."[1]

The life of the ruling classes seems to have been pleasant and leisurely, too. When they were not busy with government affairs, they spent their time with their friends — playing games, drinking tea, writing poems, playing on musical instruments or listening to music, and holding discussions. This poem tells of such a meeting of friends:

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[1] From Sung Yü, "The Man-Wind and the Woman-Wind." Translated by Arthur Waley. *A Hundred and Seventy Chinese Poems*, pp. 41–42. Alfred A. Knopf, New York, 1919.

We go to the Golden Palace:
We set out the jade cups.
We summon the honoured guests
To enter at the Golden Gate.
They enter at the Golden Gate
And go to the Golden Hall.
In the Eastern Kitchen the meat is sliced and ready —
Roast Beef and boiled pork and mutton.
The master of the Feast hands round the wine.
The harp-players sound their clear chords.
The cups are pushed aside and we face each other at chess:
The rival pawns are marshalled rank against rank.
The fire glows and the smoke puffs and curls;
From the incense-burner rises a delicate fragrance.
The clear wine has made our cheeks red;
Round the table joy and peace prevail.
May those who shared in this day's delight
Through countless autumns enjoy like felicity.[1]

Is it any wonder that art and poetry and thinking developed in China during those days? China respected her scholars and wise men.

The Teachings of Confucius

Among the wisest of China's thinkers during this period was the great philosopher Confucius. Confucius was born in 551 B.C. Like other scholars of his day, he was a government official. He found, however, that the prince of his own state did not follow his advice, so he left the court and went traveling to the courts of other princes. As he went from place to place, this wise man taught the people.

Confucius' teachings were concerned with the way men should live. He believed, first, that people should be guided by the words of the great thinkers of the past. In the old

[1] Anonymous. "The Golden Palace." Ibid. p. 49.

days, he said, men had been better and wiser. Therefore the best thing the people of his age could do was to follow their example.

Confucius taught also that people should observe all the ceremonies which had grown up in the past. Today it is hard for people of the Western world to realize just how important ceremony is to the Chinese, but in China there was a correct way of doing everything. A conversation like the following will show you the manners of two gentlemen who meet each other for the first time.

> "What is your honourable cognomen?" [name]
> "The trifling name of your little brother is Wang."
> "What is your exalted longevity?" [long life]
> "Very small. Only a miserable seventy years."
> "Where is your noble mansion?"
> "The mud hovel in which I hide is in such and such a place."
> "How many precious parcels [sons] have you?"
> "Only so many stupid little pigs."[1]

Does this sound like two men in America meeting each other for the first time? It seems amusing to you, perhaps; but we must remember that all conversation, according to Confucius, was meant to show consideration and respect. For this there was a special way of saying things which everyone understood.

How Confucius Taught the People Respect for the Family

Perhaps the most important thing in Chinese social life is the family. Emperors and dynasties might come and go, but the family stood firm. The family in China, however, was not our idea of family. When you hear the word, you think of a father and mother, brothers and sisters. The Chinese family was much larger than that. When the sons married, they did not leave home and live by themselves. They brought their wives into their father's home, and the whole group stayed together. The father was the ruler over the household, which, as you can see, included several generations: great-grandparents, grandparents, parents, and children. But even these people made up only a part of the "family." In addition the larger family included all the relatives on the father's side.

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[1] Chester Holcomb, *Etiquette and Ceremony*. From Esther Singleton's *China as Described by Great Writers*, p. 246. Dodd, Mead & Company, Inc., New York, 1912.

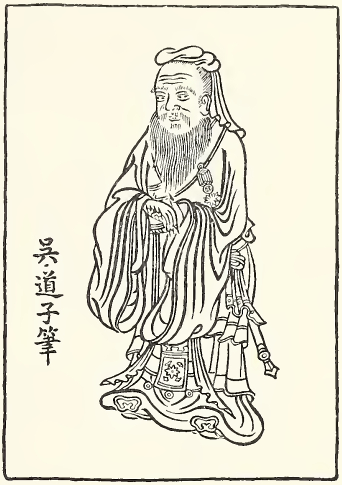

Fig. 61. Confucius. (Redrawn from an old print)

Every now and then the larger family came together for ceremonies in honor of their ancestors, the dead members of the family. Thus one of the chief duties of all men was to worship at the shrines of their ancestors. It was a tragedy, indeed, for a man to have no son to worship at his shrine. Thus reverence for the older members of the family and for the dead came to be the very center of Chinese life.

Perhaps more than anything else, Confucius encouraged this family piety. A story which is told of him shows how he believed young people should be taught to observe it.

When he was minister of crime in one of the larger states of China, a father accused his son of some wrongdoing. Confucius put both of them in prison for three months. Another minister asked Confucius why he did not punish the son only. Confucius replied: "When superiors fail in their duty, and yet go to put their inferiors to death, they are not just. This father has not taught his son to be filial; to listen to his charge would be to slay one who is innocent."

After the prison term was over, Confucius called the prisoners before him. He told the father to instruct his son in the right way of doing things. The son was told that family piety was the first duty.[1]

It seems that many Chinese learned from Confucius the lesson that sons should have respect for their elders. A story is told that in the third century after Christ a man by the name of Li Mih was offered the position as tutor to the crown prince. Instead of accepting it, he begged to be excused, saying:

> Out of pity with my orphaned condition my grandmother adopted me, and tended me with her own hands. I was very delicate; at nine still unable to walk. My family had come down; its fortunes were sadly diminished. I stood alone in the world, so forsaken, my body had to seek comfort from its own shadow.
>
> My grandmother was generally ill and confined to her bed, so that I had to wait on her and nurse her without ever being able to leave her.
>
> That I, so poor and unworthy, should have been honored with a call to the Eastern Palace is more than I can pay with my life. . . . Nevertheless I venture to hope that I may be permitted to be excused. . . .
>
> It is only because my grandmother is nearing the end of her days, and has scarcely any vitality left. Man's life is so short; in the morning he dare not count on the evening. Without my grandmother I should not have survived to the present day. Without me she would have not fulfilled the number of her years; indeed, we have preserved each other's life. Therefore I am unable to leave her even for a moment, and dare not abandon her to her fate. Should

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[1] C. Wilfred Allan, *The Makers of Cathay*, p. 6. The Presbyterian Mission Press, Shanghai, 1909.

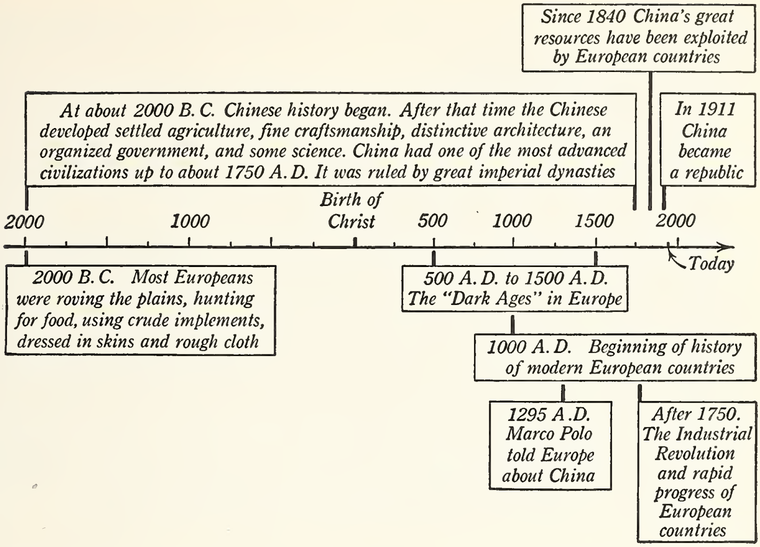
Since 1840 China's great resources have been exploited by European countries
At about 2000 B.C. Chinese history began. After that time the Chinese developed settled agriculture, fine craftsmanship, distinctive architecture, an organized government, and some science. China had one of the most advanced civilizations up to about 1750 A.D. It was ruled by great imperial dynasties
In 1911 China became a republic
2000
1000
Birth of Christ
500
1000
1500
2000
Today
2000 B.C. Most Europeans were roving the plains, hunting for food, using crude implements, dressed in skins and rough cloth
500 A.D. to 1500 A.D. The "Dark Ages" in Europe
1000 A.D. Beginning of history of modern European countries
1295 A.D. Marco Polo told Europe about China
After 1750. The Industrial Revolution and rapid progress of European countries

Fig. 62. Find the center of the time line. The birth of Christ marks the division of time as it is recorded in the Western world. Note China's long, unbroken history from 2000 B.C.

she be vouchsafed the happiness of ending her days in peace, I vow that as long as I breathe I shall be ready to lay down my life and demonstrate my gratitude even unto death.

Trembling with fear like a dog or a horse, I respectfully submit this humble petition.[1]

Thus, with Li Mih, the duty to his grandmother came before a highly honored position in the government.

You can see, then, that the teachings of Confucius emphasized keeping things as they had always been, rather than making changes. He taught the need for obedience and reverence more than he did the need for boldness in following new paths. Not all Chinese thinkers had this point of view, but Confucius seems to have had more influence than the others on the Chinese people.

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[1] A. E. Graham, *Pencil Speakings from Peking*, pp. 41–42. George Allen and Unwin, Ltd., London, 1918.

Some Great Advances under the " First Emperor "

About 200 years before Christ the Chou dynasty was swept away by a man with other ideas. He had been the ruler of one of the states of the country called Ch'in or Ts'in. After years of terrible warfare he succeeded in conquering all the other states. A Chinese historian says: "The allies [the other states] with territory ten times the extent of the Ts'in dominions, dashed a million men against her in vain. She always had her reserves in hand ready, and from first to last a million corpses bit the dust." [1]

By 221 B.C. the whole land had been united under his power. Then he called himself the "First Emperor" in order to show that the past was dead and that a new age had begun.

This vigorous and warlike emperor extended the boundaries of the country far beyond their former limits. On the north he found a number of walls built to keep out the wandering, or nomad, herdsmen from the desert. These he combined into the "Great Wall of China," much of which still stands today. It is a huge construction; indeed, it is said to be the only man-made structure on the earth which could be seen from the moon. The map following page 173 will show you where it is, and figure 63 gives a view of it.

The First Emperor, however, was not merely a warrior. He made many kinds of improvements in the arts and industry. He encouraged the crafts and trade. During his time the axles of all carts were made the same breadth in order to make the

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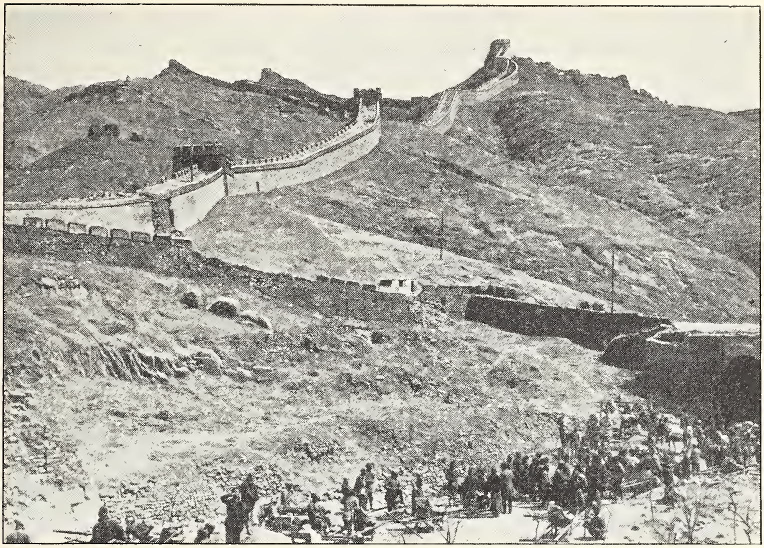
[1] Edward H. Parker, *Ancient China Simplified*, p. 151. Chapman and Hall, London, 1908.



Ewing Galloway

FIG. 63. More than 2000 years ago the Great Wall was built in northern China

transportation of goods easier. The ancient writing was made simpler, and the writing brush, which is still in use today, was invented. The system of weighing and measuring things was improved and also put into use in all of China. The calendar was improved. Altogether, the First Emperor was a man who worked out new ideas and planned new ways of doing things.

The scholars did not like all these changes, and did not hesitate to criticize the First Emperor unfavorably. Then the emperor, believing that it was the books of the past which stirred the learned men to oppose him, ordered all these books to be burned in public places. His officers scoured the country for all such books, and very few escaped them.

Now the scholars were really angry. Some of them refused to give up their books. They were therefore buried alive in a great pit. But the burning of books does not destroy the ideas, so neither side won entirely. Both the ancient ways of doing things and the achievements of the First Emperor remained to play their part in Chinese life.

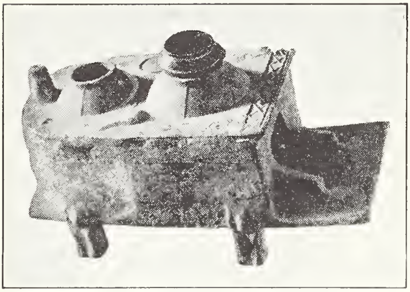


Fig. 64. The Chinese had learned to build stoves and to cook in bronze vessels like these before 12 A.D. (Courtesy of the American Museum of Natural History)

So we see that China, like the countries of the Mediterranean, had developed art, literature, philosophy, government, trade, and industry. There were differences between the two civilizations, but underneath they were much alike. Each was building an advanced way of life.

Did China Influence Other Parts of the Earth?

Did Chinese civilization, like those of Egypt and Mesopotamia, spread to other lands? Yes, indeed. At first it was centered in a small region south of the Yellow River. There the life of the barbarians near by was changed, and gradually Chinese ways of living spread south beyond the Yangtse as far as the southern ocean. On the west to the mountains, on the north to the Great Wall, on the east to the sea, they went.

Nor did Chinese influence stop there. Beyond China proper, people began to introduce Chinese ideas and customs into the region which today we call French Indo-China. Across the vast ranges of the Himalayas lay India, where another civilization was rising. Between these two lands travelers went back and forth exchanging their knowledge with each other. The highlands of Tibet too, to the west of China, felt China's influence.

To a certain extent so did the wandering tribes of Mongolia. Indeed, ways of living in all of far-eastern Asia and southern Asia were changed through imitation of Chinese civilization.

Japan and Chosen Learned the Civilized Ways of the Ancient Chinese

Perhaps no two countries have been more influenced by China than Chosen and Japan. Today Japan is an important country, but 2000 years ago even the Chinese had heard only vague rumors of some beautiful islands to the east of the mainland of Asia. In the first century of the Christian Era the emperor sent a physician and some young people on a mission to find out more about these islands. When they returned, they told stories of the strangest people and the wildest customs; indeed, the Chinese thought these people very uncivilized.

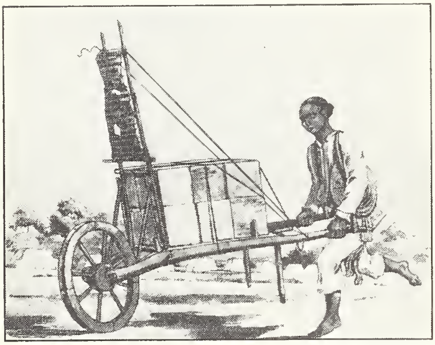
At that time the Japanese had not developed a civilization, but after their contact with Chinese ways they soon began to change. At first they learned from the Koreans (the people of Chosen), who had received much of what they knew from China. Later they learned from the Chinese themselves. By the 500's A.D. a close connection had grown up between Japan and Chosen and China. Traders and messengers traveled back and forth. Chinese scholars and craftsmen settled in Japan.

After some centuries Japanese civilization was flourishing, and a large part of it had come from China. Japan's writing, her art, and her architecture all show Chinese influence. Buddhism, the religion which had originally come from India to China, now spread to Japan. The Buddhist temples of Japan are much like those of China.

Figure 58 will give you an idea of the influence of Chinese art on that of Japan. This influence was to be found in other Far Eastern lands also.

Chinese Influence Spread Even to Europe

If you will look at your map following page 173, you will see how geography affected China in her relations with other countries. Notice how the country is surrounded by mountains and deserts. Find the Himalayas, the Altai, and the Tien Shan and the great Gobi (*Gobi* means "desert"). These vast mountain chains can be crossed only at certain places and then with great difficulty. Deserts like the Gobi are always hard to travel because of lack of water. Moreover, in those days both mountains and deserts were inhabited by warlike, wandering peoples ready to pounce upon any adventurous travelers. Thus China was cut off from most of the world, and the rest of the world was cut off from China.



Bettmann Archive

Fig. 65. A Chinese wheelbarrow with a sail. What kinds of power are being used?

Nevertheless over 1000 years ago an overland trade route grew up from China to the Mediterranean Sea. Across the mountains and deserts merchants eager for trade tramped back and forth with Chinese wares. We shall see later how some goods were exchanged between China and Greece and Rome even 2000 years ago. And coming close to our own times — about 1700 A.D. — we shall see how the arts and crafts of China traveled to Italy and the Mediterranean region. It was not until after 1500 A.D., however, that this trading back and forth led to much exchange of ideas.

How Did China's Location Affect Her Civilization?

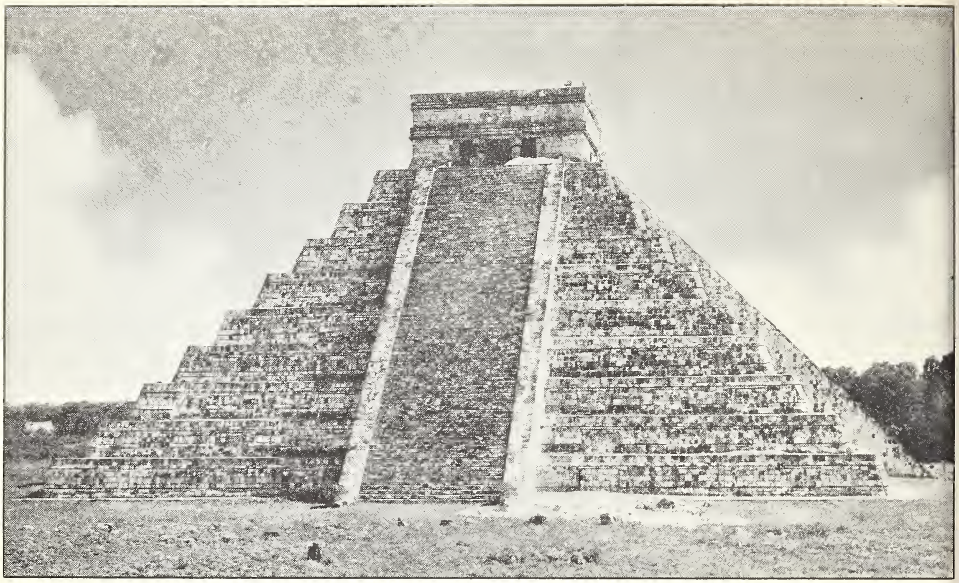
What did being shut in, in the Far East, mean to China? It meant that not much change could come to China from the outside; all her growth must come from within. The new countries of the Mediterranean and of Europe could exchange ideas and customs and inventions more easily and thus could change their ways of living more rapidly. Perhaps this was one reason why Chinese civilization tended to change less than that of the Mediterranean countries. China did not have enough contact with countries that were becoming her equals.

There was one advantage, however, in this separation of China from the rest of the world. It made her more lasting. Of the countries of the Near East, — Egypt, Babylonia, Assyria, Crete, — which were young when China was young, all but Egypt have long ago perished. China alone exists as one of the most important countries of the world. It is true that China was conquered several times by the nomad warriors to the north. But what happened? These foreigners came to live in the country, and they became as Chinese as the Chinese.

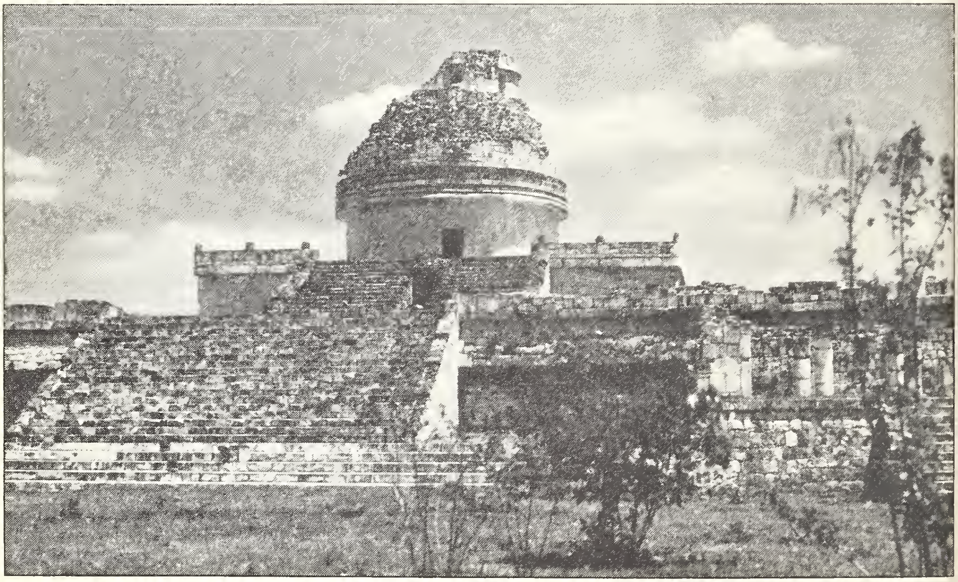
In the end China was the conqueror.

Books You Would Like To Read

Bunker, F. F. China and Japan. J. B. Lippincott Company, Philadelphia.
Chrisman, A. B. Shen of the Sea. E. P. Dutton & Co., Inc., New York.
Franck, H. A. China Travels in Many Lands. F. A. Owen Publishing Company, Dansville, New York.
Hodgdon, J. R. The Enchanted Past. Ginn and Company, Boston.
Johnston, L. E. China. The Macmillan Company, New York.
Kiner, Grace. Children of China. Follett Publishing Company, Chicago.
Price, Olivia. Middle Country. World Book Company, New York.
Seeger, Elizabeth. The Pageant of Chinese History. Longmans, Green & Co., New York.



Chichen Itza's chief sanctuary, "El Castillo," as it now appears



Ewing Galloway

Here the Maya scientists studied the heavens and made a calendar

Fig. 66. These remarkable buildings show that the Mayas had a very advanced civilization

CHAPTER X

The Ancient Civilization of the Americas: Still Another Cradle?

THE ONLY other ancient civilization that is known today covered a part of each of the continents of North and South America. It probably began in the region called Central America, which stretches southward from Yucatan, at about 20° north latitude, across Guatemala, Honduras, Nicaragua, Costa Rica, and Panama. But remains of this ancient civilization show that it extended as far south as Colombia, Ecuador, Peru, Bolivia, and parts of Chile and Argentina, in South America, and north into Mexico in North America.

Where Did This Civilization Begin?

It is generally thought that the Mayas of Central America were one of the first peoples to develop advanced civilization in the Western Hemisphere. In October, 1929, Colonel and Mrs. Charles A. Lindbergh flew in an airplane over much of the territory where the Mayas had lived. With the Lindberghs were Dr. A. V. Kidder and Dr. O. G. Ricketson, archaeologists of the Carnegie Institution of Washington, D.C. On the trip they took some airplane photographs of the land below. Figure 66, which has been made from two of these photographs, shows at a glance what a remarkable civilization had been built up there long ago.

For centuries these buildings of concrete and stone had been hidden from Europeans and Americans. One reason was that parts of them had slowly crumbled away. More important, however, was the fact that during the years a thick tropical jungle had grown up over them. Some time before the Lindberghs' flight, archaeologists had found them. Recently much exploring and excavating has been done.

How old is the civilization? Some scientists think that these early "American" people were really civilized as long ago as 4000 B.C. By then the people of the highlands along the coast seem to have begun to cultivate maize, to make pottery, and to weave cloth. How long a time passed before they went beyond these most simple civilized ways of living, no one knows.

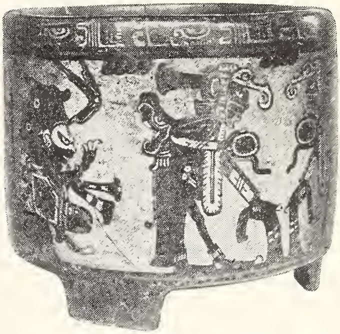
It is thought that the cultivation of maize and the making of pottery and cloth were so useful to these people that other peoples naturally began to copy them. Gradually these ideas spread out from their original home into other parts of North America and into South America. When this happened, the beginnings of civilization appeared there.

1. The Civilization of the Mayas

It is believed that from 500 B.C. (perhaps earlier) to about 500 A.D. the Mayas developed a very advanced civilization. Their kingdom included the territory now in Tabasco and Chiapas in Mexico, northern and eastern Guatemala, and the western part of Honduras (figure 68). Today this area is tropical forest, but at that time it was cultivated farm land.

There were large cities with magnificent buildings, temples erected on pyramids, and elaborate palaces. Carved monuments decorated the courts, or plazas, which surrounded the houses. The buildings, made of cut stone, were decorated both inside and out with carvings and paintings. There were beautiful designs on the walls. Figures 66 and 67 give you some ideas of Mayan architecture and decoration.

These Mayas had other arts too. Although they had not learned to use metal for tools, they succeeded in some unknown way in carving jade, a very hard stone. Out of it they made many kinds of ornaments: necklaces, beads, earrings, anklets, and the like. They carved things out of wood and wove beautiful cloth. They made beautiful vessels of clay and decorated them with little figures of men and women. Many of these figures are well formed, and some of them are most amusing.



Museum of the American Indian

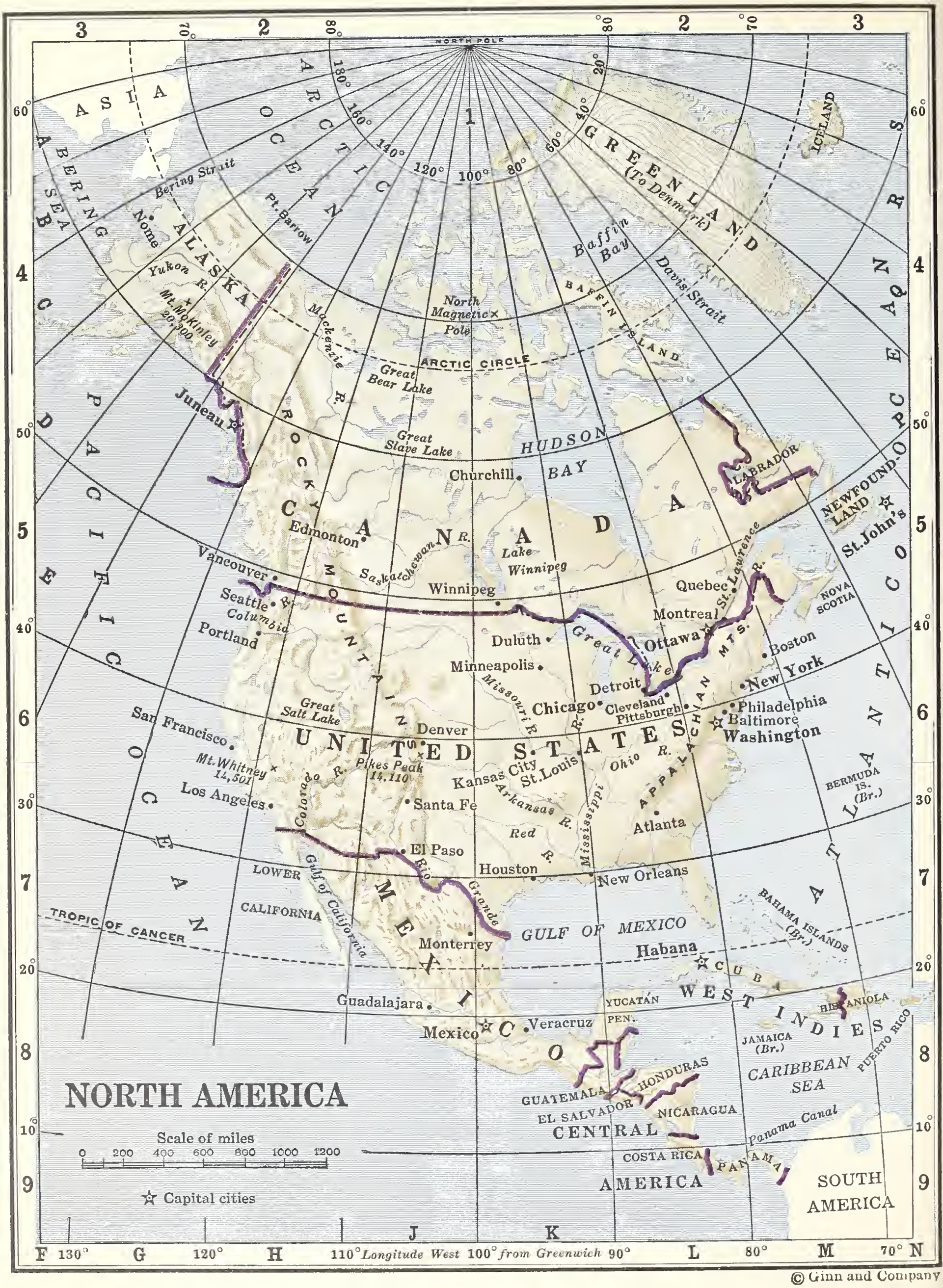
FIG. 67. This jar painted in many colors shows what beautiful things the Mayas knew how to make

By 160 A.D. the Mayas had a system of writing and a very accurate calendar based on the study of astronomy. From 300 to 600 A.D. was their great age. It was then that they made books by writing on both sides of long sheets of paper. These were folded like Chinese screens. Only three of these have been found, and only a part of each can be read. They show, however, that the Mayas knew much about arithmetic and astronomy.

You can see, therefore, from the work of the Mayan artists, architects, and scholars that their civilization was probably as advanced as that of any of the others which you have already read about.

The Whole Civilization Moved!

But changes were in store for this wonderful civilization, with its art, its architecture, and its learning. During the 600's A.D. the Mayas were forced to leave this region and find



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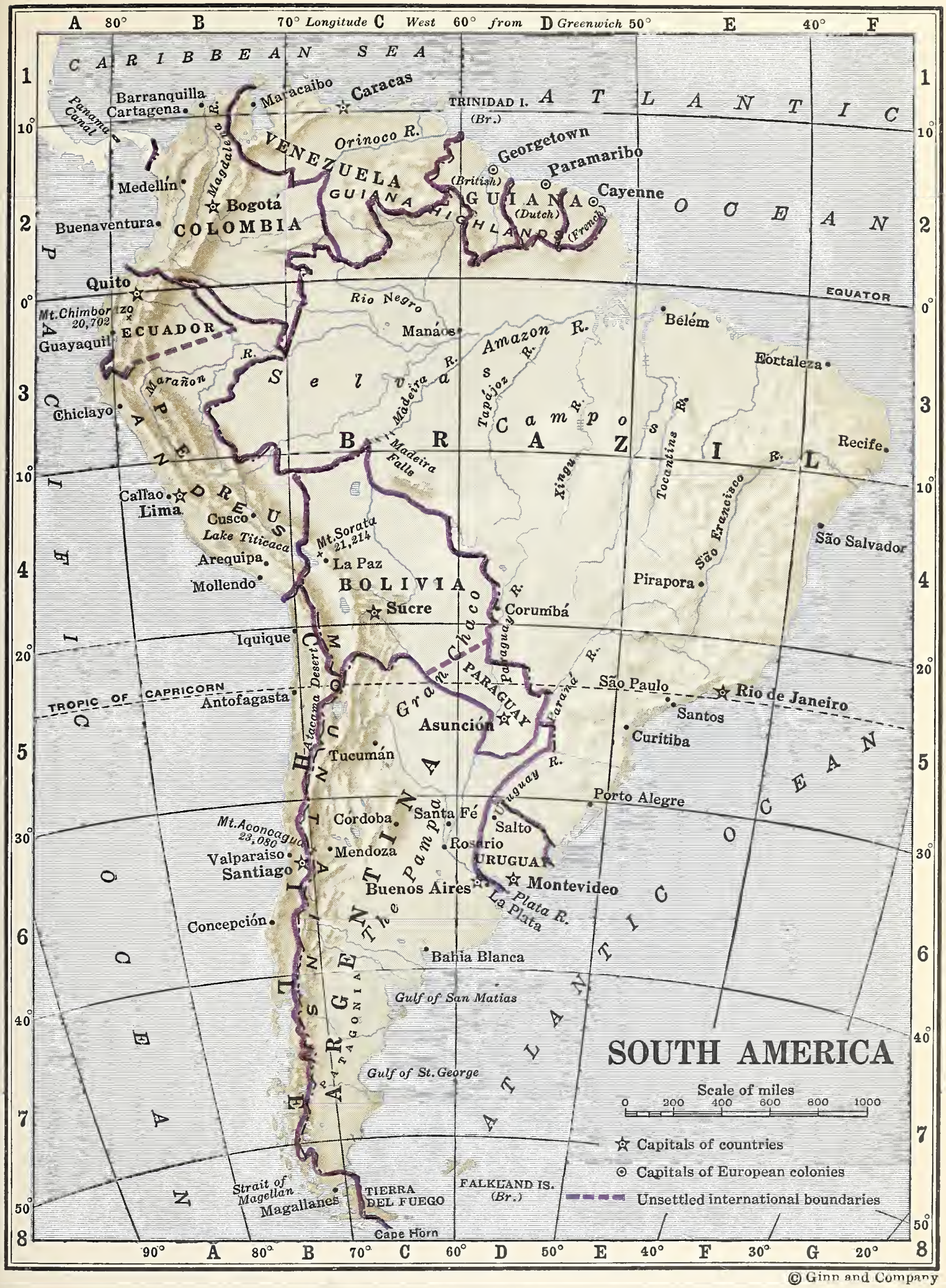

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new homes elsewhere. No one knows exactly why they had to go. Some students think that they had used the same land for so long without knowing how to improve the soil that cereals and other plants would no longer grow there.

So the Mayas moved, leaving their wonderful palaces and temples, their monuments and works of art, to be buried under a vast tropical forest. Gradually they pushed northward toward Yucatan, a dry land with no rivers and only one or two lakes. Here they found some large holes in the ground which were filled with water from underground streams. At one place in particular two of these huge natural wells were within half a mile of each other. More and more the Mayan travelers gathered around these two water holes. At first the settlement was a small one; but the numbers grew and grew until finally it became the great city of Chichen Itza. Scientists are certain that the Mayas were living in Chichen Itza in the early 600's A.D., because they found one monument on which the dedication date was written. In our calendar this date would read August 28, 619 A.D.

For some unknown reason the Mayas left this city also. In 668 they moved westward across the peninsula of Yucatan. There they founded a new capital called Chakanputum. For more than two centuries they lived here; but in 944 they had to leave because their city was destroyed by fire. Then back to Chichen Itza they moved, probably drawn there by the two cool and refreshing water holes. By 964 they were again occupying Chichen Itza.

During the four centuries following 600, more and more Mayas moved out of their first homeland and entered Yucatan from the south. As that happened, other cities began to grow up. In 1004 the three largest city-states — Chichen Itza, Uxmal, and Mayapan — joined to form the League of Mayapan. It was agreed that the government of the whole peninsula should be divided equally among them. There, Mayan art and architecture again reached great heights. In this new home they again erected wonderful buildings of cut stone and decorated them with sculpture and paintings. In every town and village the pyramid-temple and the chief's house of stone was to be seen.

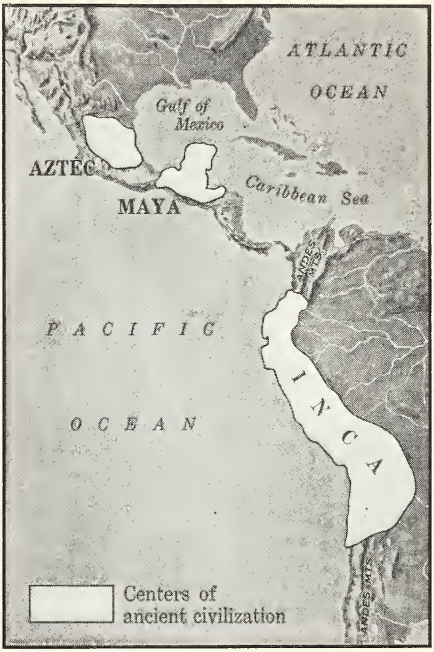


Fig. 68. Three Indian civilizations grew up in Central and South America

Two centuries later the League of Mayapan was broken up by war. The ruler of Mayapan, named Hunnac Ceel, defeated the Itzas. He was able to do this with the help of peoples who are called Toltec-Aztecs. They came from central Mexico. These allies of Hunnac Ceel now became the rulers of the Itza people. As a result new customs, new arts and new architecture, and a new religion came to the Mayan kingdom.

From 1201 to 1448 more structures went up than had been built since the city had been founded six centuries earlier. Especially was this true of temples to the Aztec god, the golden-haired "feathered serpent."

But in 1448 the city was again deserted. The Mayas left their beautiful buildings and moved southward in the direction of their earlier homes.

On January 1, 1924, the Carnegie Institute of Washington, with the permission of the Republic of Mexico, began to study the civilization of the Mayas. They sent archaeologists to find the ruins of Chichen Itza. Like the earlier Mayan cities, this one had also become covered with forests. But they were able to clear away the trees. What they found proved that the Mayas were great artists, sculptors, and architects. One particular discovery was the Court of Columns. In a space covering five acres of land more than 1000 round and square columns have been found around temples and halls, and forming colonnades. Here, indeed, had been an advanced civilization!

Perhaps you are thinking, "What happened to the Mayas?" Well, today there are about 200,000 of them working for foreigners in the fields of Yucatan. They have few needs, and these are easily satisfied. Their food is simple, consisting of tortillas, black beans, squash, and chili. They wear cotton garments. Indeed, they have none of the great marks of civilization which were theirs in the earlier days.

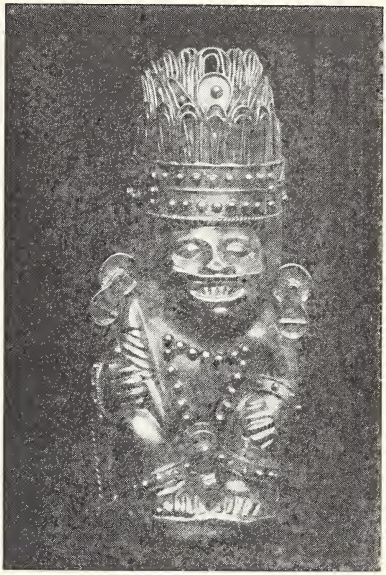
2. The Aztec Civilization of Mexico

We mentioned that about 1200 the Aztec Indians from central Mexico entered the land of the Mayas, made war upon them, and became their rulers. Were these Aztecs an ancient people too? Were they civilized?

No one knows the answers to these questions. It is thought that they did not come to Mexico until the 1100's or 1200's. Scientists believe also that they learned much from the Mayas. But by the time the Spaniards arrived in the early 1500's they had developed a remarkable civilization.

Our information of the advanced ways of living of the Aztecs has been passed on by the Spaniards who, under Cortes, conquered this powerful nation between 1519 and 1521. These Spaniards had much to say of the marvelous buildings, of the gold and silver and precious stones, of the pottery and the feather blankets, of all the beautiful things they found in the Aztec cities.

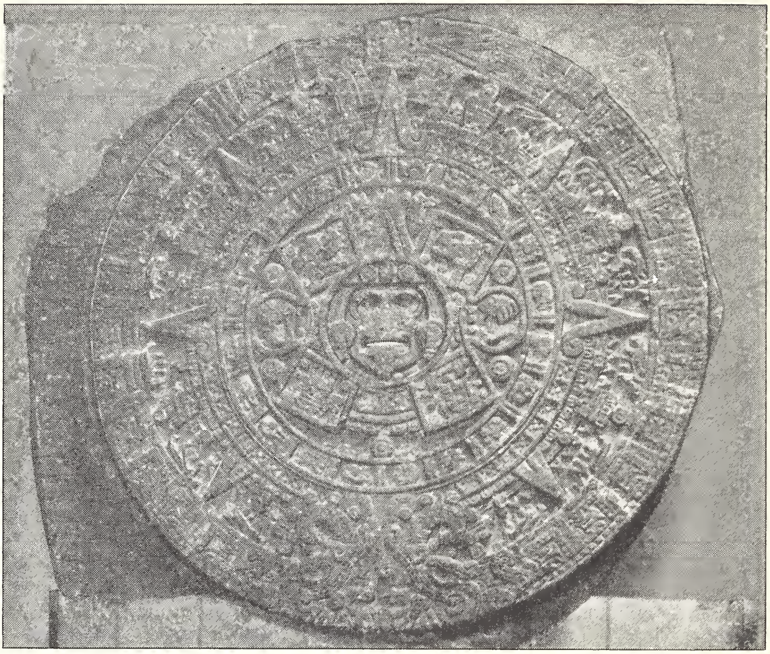
As you can imagine, there was much buying and selling in a land where there were farms and cities and where skilled craftsmen made all kinds of goods. One of the Spanish conquerors describes a city market at which there gathered 20,000 or 25,000 people. He says:



Museum of the American Indian

FIG. 69. A gold figure of the Aztec king Tizoc, found in Mexico

> On one side are the people who sell gold; near them are they who trade in jewels mounted in gold in the forms of birds and animals. On another side beads and mirrors are sold, on another, feathers and plumes of all colours for working designs on garments to wear in war or at festivals. Further on, stone is worked to make razors and swords.
>
> In other places they sell cloth and men's dresses of different designs. Beyond, dresses for women, and in another part, footgear. A section is reserved for the sale of prepared hides of deer and other animals. Elsewhere are baskets made of hair such as all Indian women use. Cotton, grain which forms their food, bread of all kinds, pastry, fowls, and eggs are sold in different sections and near by they sell hares, rabbits, deer, quails, geese, and ducks. Elsewhere wines of all sorts are for sale, vegetables, pepper, roots, fruits of all



Ewing Galloway

Fig. 70. With the use of this calendar stone our scientists have been able to learn much about the Aztec system of telling time

kinds, wood for building, lime and stone. In fact, each object has its place. Beside this market place there are other markets also where provisions may be bought.[1]

One of the most interesting things which has been found by archaeologists is the round calendar stone (figure 70) which the Aztecs had set up in front of the Temple of the Sun. By this they kept a record of days, months, and years. It seems also to have been used for another and less attractive purpose, that of an altar upon which human beings were sacrificed to the cruel Aztec god.

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[1] Adapted from Thomas S. Joyce, *Mexican Archaeology*, p. 129. G. P. Putnam's Sons, New York, 1914.

After the Spaniards conquered Mexico in the early 1500's this interesting civilization came to an abrupt end. No more did the Aztecs build temples, carve stone, work in gold, silver, and copper, and weave blankets and other textiles. From that time on they were a subject people — mere Indians. They were ruled by Spaniards for 300 years.

To a certain extent, however, the Aztec influence lingered on. Many of the arts had already spread to other Indian peoples. Farther north on the continent the tribes of the present southwest United States, the Pueblo Indians, had reached some advanced ways of living, and they had learned much from the civilizations of Central America and Mexico. They built large dwelling places; they irrigated their farms; they modeled clay and wove cloth with some skill. Farther away, on the eastern coast, other Indians were tilling the soil and making pottery. Indeed, as long as the old Indian life continues at all, we shall be able to see some traces of these dead civilizations.

3. The Inca Civilization of South America

But there was still another civilization in the Americas that was even greater, perhaps, than that of the Mayas or the Aztecs. This was in the northwestern part of South America, in the region now known as Peru.

"How could this have happened?" you are asking. To answer that question we must turn once more to our friend geography. Geography might help to show how all the things that were needed for civilization were at hand.

The Geography of the Andes Mountain Region

Let us look at the map of South America (following page 191). Notice, first of all, the Andes, those enormous high chains of young mountains. They rise as a tall barrier in Colombia and Ecuador and Peru and extend along the entire west coast through Bolivia and Chile. In Colombia and Ecuador they are from 15,000 to 18,000 feet high, and in Peru they rise up from the coast to a height of from 10,000 to 14,000 feet.

Across the middle parts of these countries is a central plateau, also about 10,000 to 14,000 feet high and from 100 to 400 miles wide. East of this plateau the ranges rise still higher and higher, finally reaching 21,000 feet in eastern Peru and Bolivia.

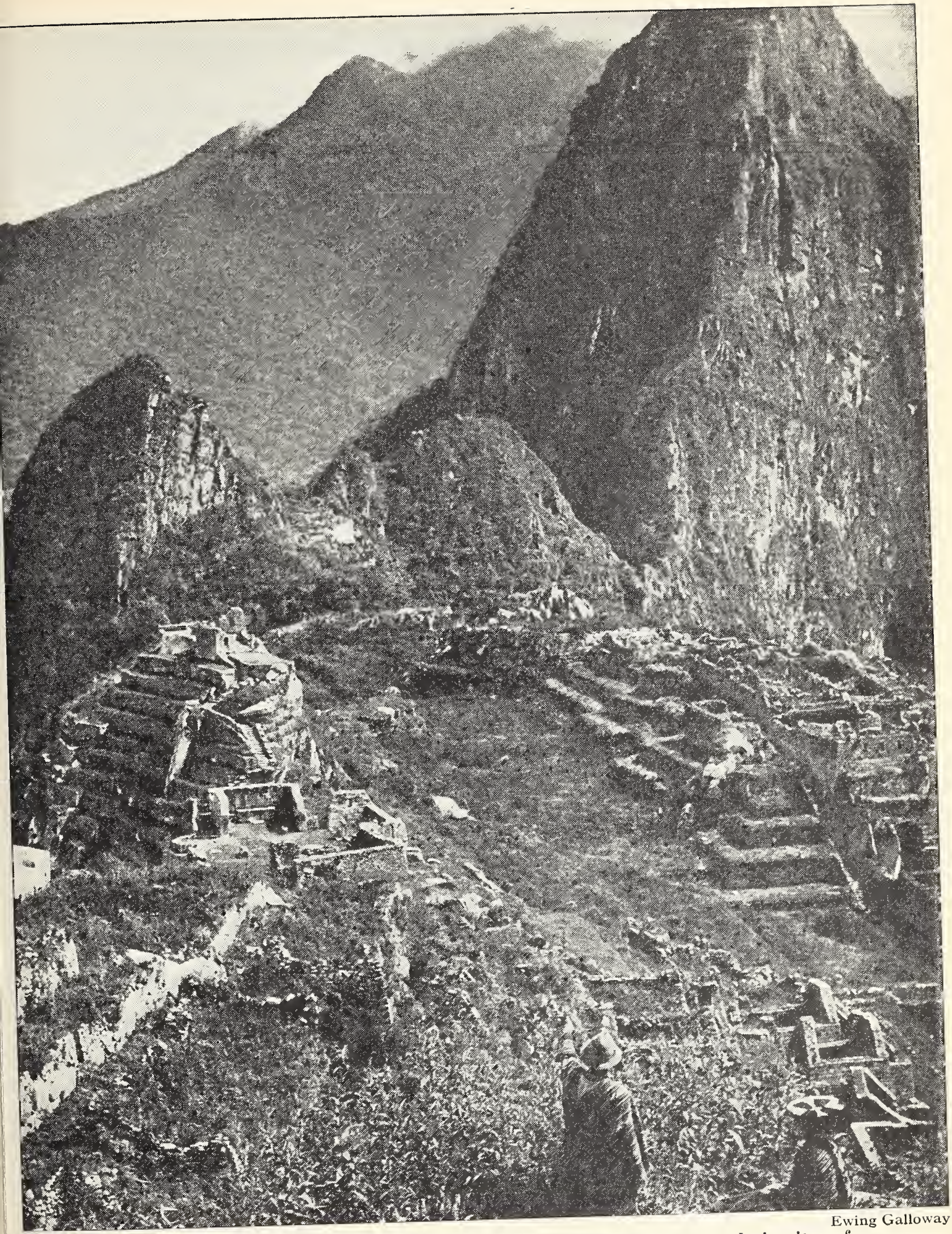
These tall young mountains of the west coast of South America are really a continuation of those of North America which we call the Rocky Mountains. In southern Mexico the mountains are called the Southern Sierra Madre. There they are from 10,000 to 18,000 feet high. In Honduras and Guatemala, where the Mayan civilization arose, they are from 5000 to 10,000 feet high.

Remember, then, that in ancient times the center of these American Indian civilizations was in this high mountain "backbone" of South and Central America.

The Geography of the Coast of Peru

Look next at the narrow plains on the coast of Peru. These are low lands, — at sea level, — and they are tropical, extending south of the equator from 3° to about 15° south latitude.

Let us, in imagination, fly over the 1500-mile plain. Here it is hot in the daytime, but the nights are quite cool. How can



Ewing Galloway

FIG. 71. Seven thousand feet above the sea the Incas built their city of Machu Picchu. What must they have known in order to do this?

it be so cool near the equator? Because of the "Humboldt Current." In 1800 a famous European scientist named Humboldt discovered that a wide current of water, now called the Humboldt Current, flows northward out of the cold Antarctic waters. Through the Pacific it travels along the west coast of South America. Even by the time it reaches Peru the water is still cool. All along this coast, therefore, the winds blowing over this water become very cool. They cool the valley region, so that at night the people can sleep well. Hence, in spite of being in the tropics, the people have energy to work.

Winding here and there over this plain, we look down upon lovely green valleys. In the whole area between Ecuador and Chile there are 60 of them. Fields of cotton and maize and groves of fruit trees are cared for by the people of today. Villages nestle here and there in the valleys bounded by hills. And beyond, in all directions, between the coast and the rising Andes Mountains is dry desert.

Scientists believe that in these coastal valleys of Peru the conditions were favorable for man to develop civilized ways of living.

1. Here was a warm, even a hot, climate. But it was a stimulating climate also because of the cool night winds blowing inland from over the Humboldt Current.
2. The soil in these little valleys was gradually built up from the silt brought down from the mountains by the rivers. Hence it was very rich for farming.
3. On the river banks grew wild plants, such as barley and emmer. There was plenty of floodwater in the streams for irrigation.
4. Reeds growing thickly on the river banks could supply the materials needed for mat-making and basket-making.
5. There was much clay at hand for pottery-making to develop.

6. Out of the soil mud huts could be built; there were also stone and wood for houses.
7. Human beings could eat the fish in the sea and the rivers. Birds were near by, and many wild animals in the foothills of the mountains could provide food. Supplies of these were large enough for a great many people.

Here, then, were many conditions favorable to helping a Stone Age people gradually to learn how to settle down and develop civilization. Here, the scientists say, men left their hunting-and-fishing way of life and settled down. Here they raised food from the ground, lived in villages and towns, and did the other things that civilized peoples do.

Did the "Amerindians"[1] Develop Their Own Civilization?

Did these ancient men develop their civilization? We do not know! We know only that, certainly as long ago as 1000 B.C. and perhaps earlier, a magnificent civilization had developed both along the coast and in the Andean highlands above it. But whether or not these ancient Indians of the river valleys of Peru developed it, no one knows.

There are two answers to this question. Some archaeologists think that the peoples of Asia who settled the islands of the Pacific 2000 and more years ago sailed as far eastward as the coast of South America; that they settled there and carried on farming, pottery, weaving, and housebuilding, as their ancestors had learned it long, long before — perhaps from the people of Egypt and the Near East. That is one idea.

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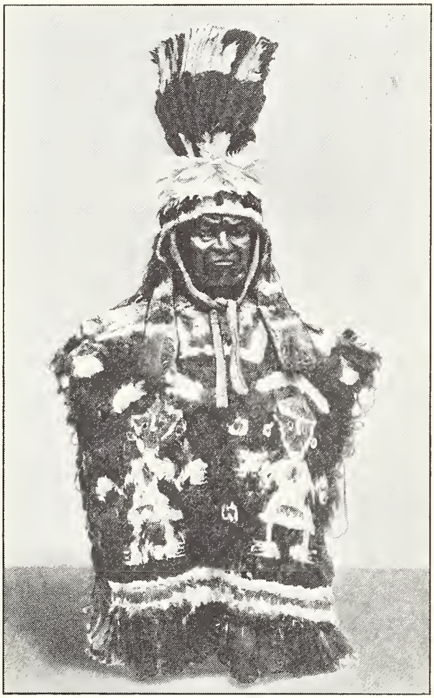
[1] The word *Amerindians* has been made by scientists by combining two words — "American" and "Indians."

Mongol Ancestors

Other archaeologists have a different answer. They say that since the conditions were favorable for it, it is more than likely that the people on the South American coast slowly developed new ways themselves. They think that the ancestors of the Indians who live along the western coast of North and South America — all the way from Alaska to Chile — probably came from Asia! When did this happen? No one knows exactly. The scientists estimate that it was in one of the interglacial periods, perhaps 50,000 years ago, perhaps more.

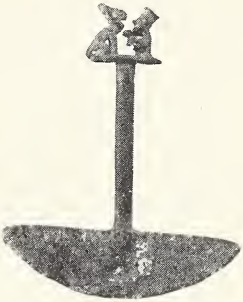


Museum of the American Indian

FIG. 72. Costumes made of feathers were worn by the Incas

How did they come? It is thought they came over the cold Bering Strait region across the land, perhaps at a time when Asia and North America were joined together.

Imagine such family groups or small tribes of men, women, and children like those of figure 30 slowly making their way from Tibet, China, and Mongolia up into the eastern Siberian peninsula! Across the neck of land to Alaska and south along the west coast they went. So slowly did these things happen that many thousands of years must have passed before they reached the southern continent. But finally these Old Stone Age nomad hunters and fishermen made their way into the warm region of Mexico and Central America and the west coast of South America. Perhaps they lived along these coast and mountain highlands for thousands and thousands of years without settling down. But finally they reached the most favorable regions, where they developed farming and the other ways of civilization.



A. M. N. H.

Fig. 73. This knife shows that the Incas also knew how to use bronze

Whether this is the true explanation, we do not know. Perhaps we never shall know. But that a very advanced kind of civilization grew up in the Americas 3000, perhaps 4000, years ago we do know.

Who were these ancient civilized peoples? There were two groups — the Chimus and the Incas. Let us look at the Chimus first.

The Chimus

In the 1520's a group of Spaniards under their leader Pizarro were traveling south along the west coast of South America. Near a place on the coast of Peru which is now called Trujillo they discovered an ancient city called Chan-Chan. This had at one time been the capital of an old, old kingdom of an Amerindian people called Chimus. We do not know how old the city was or how long the Chimus had lived there and in the surrounding regions. We do not even know what the Chimus looked like. Nevertheless we can be sure that they had been there for many hundreds of years, perhaps 1000, 2000, or even longer.

The ruins of this city and the things which were buried in the graves of these people prove that they had advanced ways of living. There were broad city avenues, yards, and gardens. There were beautiful palaces. A canal had been constructed leading from a river some miles away to the city, so that the people could always have fresh water.

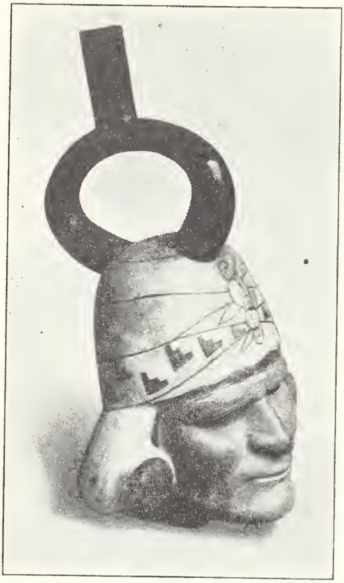

Underwood and Underwood

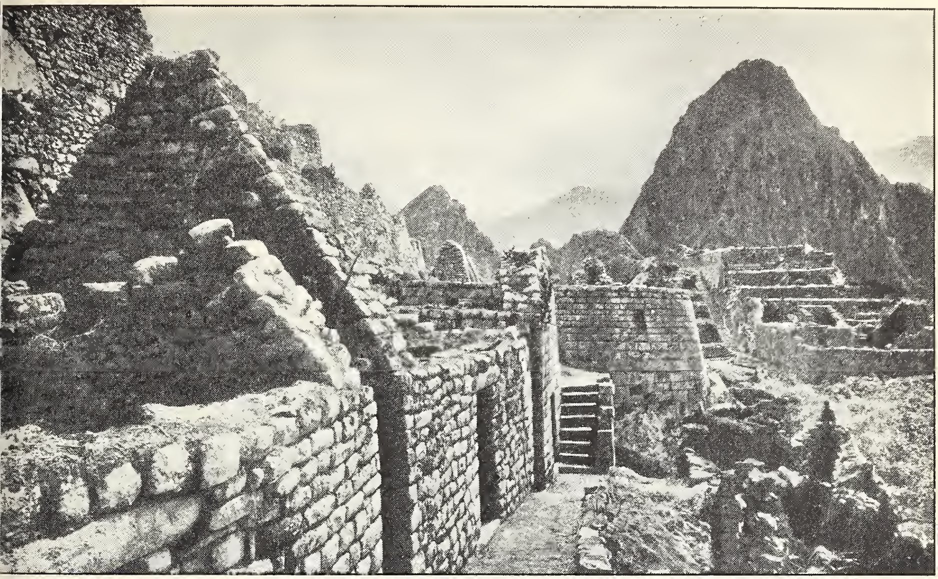
FIG. 74. This clay figure found in Peru is thought to have been made by the Chimus, those people who lived in Peru before the Incas conquered them

Wonderful treasures have been found in the tombs of the Chimu nobles. There were tools and implements made of copper and of bronze. Copper bowls were covered with a layer of silver or gold. And most of these things were beautifully carved and decorated by skillful craftsmen.

Through such works of art as these we can be sure that these ancient Chimus were indeed a civilized people. These treasures tell us how they hunted and fished, how they farmed the land, how they cooked and served their food, how they danced and spent their leisure time. How do these people compare with other early peoples?

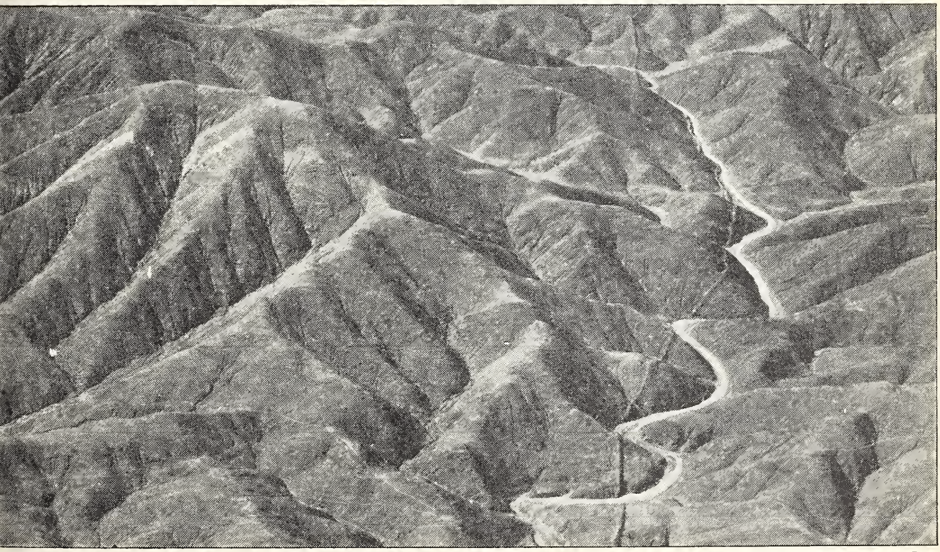
The Incas

By the time Pizarro came, however, the Chimus had lost all their power; indeed, they had disappeared. They had been conquered by a stronger people called the Incas, the "People of the Sun," who had come up from the South. On their way



Ewing Galloway

FIG. 75. Machu Picchu was built 2000 years ago high in the Andes of Peru. White granite was used for the palaces, temples, shrines, and baths



Aerial Explorations, Inc.

FIG. 76. The Great Wall of Peru was built across the Andes in Peru more than 2000 years ago

northward these Inca Indians had conquered group after group until they had control of a great kingdom.

For a long time the Chimus succeeded in keeping the Inca warriors out. It is thought that they built the Great Wall just south of Chan-Chan for protection from the invaders.

But the Incas were very clever. They got the idea of damming up the river which supplied the Chimus with water. Their water supply cut off, the Chimus had to surrender.

The Incas were ruling over this great kingdom when Pizarro came. Their rule extended over the present countries of Peru, Ecuador, Bolivia, a part of Chile, and northwest Argentina. It covered about a million square miles and probably included ten or eleven million people. They had a southern capital called Cusco and a northern one called Cajmarca.

And what remarkable ways of living they developed! They were excellent farmers who irrigated their lands by digging canals from the rivers. They raised cereals and stored them in granaries. They were skillful builders, having many forts, walls, temples, and other buildings. Most of these were made of carefully cut pieces of stone. They had to be expertly cut; for the builders did not use cement or mortar, as we do. The houses of most of the people, however, were made of sundried bricks.

Excellent roads connected the various parts of their vast empire. These were useful for trade and also enabled the government to move its armies quickly. One of the Spanish conquerors describes these roads:

> Some of them extended for over one thousand and one hundred leagues along such dizzy and frightful abysses that, looking down, the sight failed one. In some places, to secure the regular width, it was necessary to hew a path out of the living rock; all of which was done with fire and their picks.
>
> In other places the ascents were so steep and high that steps had to be cut from below to enable the ascent to be made, with wider

spaces at intervals for resting places. In other parts there were great heaps of snow, which were more to be feared, and not at one spot only, but often recurring. Where the snows obstructed the way, and where there were forests of trees and loose clods of earth, the road was levelled and paved with stones when necessary.[1]

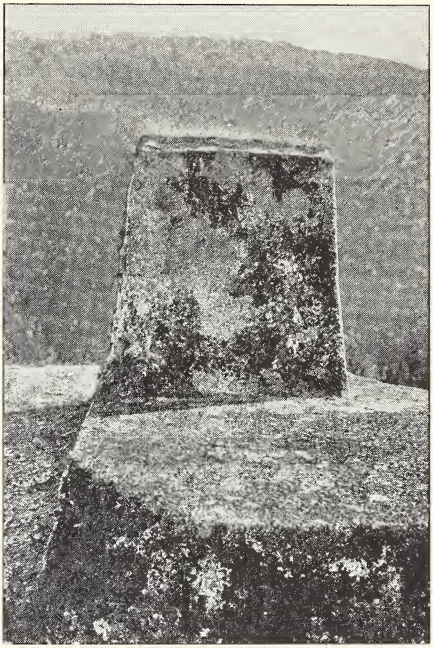

Ewing Galloway

FIG. 77. In Quechuan, the language of the Incas, *inti* means "sun" and *huatana* means "stone." This Intihuatana Stone was used as a sundial

The government of the Incas was strong and well organized. Some officers were appointed to travel throughout the country to collect the tribute for the court. Others were sent out to see to it that the people were orderly and obeyed the laws. There was an army which could be quickly collected and sent to any place where it was needed.

Everywhere the Incas built temples and palaces and other fine buildings. Many of these were decorated with gold. Around them were beautiful flower gardens and trees, and fountains made of gold.

The Incas had a very unusual system of recording events and describing happenings. They did not use picture-writing, as did the Indians of Mexico. Instead they had a clever way of using cords. They tied knots in certain ways to mean certain things. If they painted these in special ways and colors, other things were meant.

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[1] Thomas A. Joyce, *South American Archaeology*, pp. 106–107. G. P. Putnam's Sons, New York, 1912.

Then came the Spaniards. They robbed the Incas of their jewels, their treasures, their works of art; indeed, they destroyed the very civilization. The land fell into ruin. Canals and ponds were no longer used. The fine roads were neglected and disappeared. Gardens and fields on the mountain terraces dried up because of lack of water. Those Incas who were not made slaves fled to the mountains.

Don't you think it a little sad that these civilizations did not have a chance to continue to develop as did those of the Mediterranean region and eastern Asia?

Books You Would Like To Read

BOWMAN, ISAIAH. South America. Rand McNally & Company, Chicago.

FINGER, CHARLES J. Tales from Silver Lands. Doubleday, Doran & Company, Inc., Garden City, New York.

FRANCK, H. A. Mexico and Central America. (Travels in Many Lands.) F. A. Owen Publishing Company, Dansville, New York.

JANVIER, T. A. Aztec Treasure House. Harper & Brothers, New York.

MALKUS, ALIDA SIMS. The Dark Star of Itza. Harcourt, Brace and Company, Inc., New York.

MORRIS, MRS. A. Digging in Yucatan. Doubleday, Doran & Company, Inc., Garden City, New York.

PRESCOTT, WILLIAM H. The Conquest of Mexico. Junior Literary Guild, New York.

PURNELL, IDELLA. The Wishing Owl. The Macmillan Company, New York.

PURNELL, IDELLA, and WEATHERWAX, JOHN M. The Talking Bird. The Macmillan Company, New York.

RHOADS, DOROTHY. Bright Feather and Other Mayan Tales. Doubleday, Doran & Company, Inc., Garden City, New York.

SANCHEZ, MRS. N. V. DEG. Stories of the Latin American States. Thomas Y. Crowell Company, New York.

SMITH, MRS. S. C. Made in Mexico. Alfred A. Knopf, Inc., New York.

PART IV

Civilization Spreads Northwestward into Europe

WE HAVE now finished the first part of the story of how civilizations were first developed some 6000 years ago. Although the chapters we have read have been little more than an outline, they have shown us clearly that at least 2500 years ago several great civilizations had grown up in the lands around the eastern ends of the Mediterranean Sea. Whether theirs was really the first civilization on the earth, we cannot be sure. Whether the Egyptian and Mesopotamian ways of living were copied through Asia and spread to the Americas, we do not know.

But one thing we do know; that is, that out of this eastern Mediterranean way of life grew the new European civilization. Out of the European civilization grew the other modern ones — our own American civilization and those of Canada and Latin America, Australia, New Zealand, South Africa. Moreover, this modern European civilization is swiftly changing ways of living in Japan, China, Asiatic Russia, India, and many islands of the earth. In a direct line, over some 3000 years at least, the world-wide industrial civilization of today grew out of those ancient ones that started between the Near East and southeastern Europe.

New Peoples Enter the Scene

From this point we shall be little concerned with the Egyptian and Mesopotamian civilizations. A new people will engage most of our attention. They are, we think today, the people who had the most to do with the building of European-American civilization. To them we turn in Chapters XI to XVI.

CHAPTER XI

The Races of Mankind

WE MUST pause a bit and turn briefly to a new problem; that is, the problem of race. Through all the books of Man and His Changing Society we have referred frequently to the "races of mankind." But we have never studied them carefully. We must do so now in order to understand how the European ways of living with which we are familiar grew out of the ancient civilizations of the Near East.

Many Ways To Use the Word *Race*

People use the word *race* in many different ways. They speak of the "human race." By that they mean all the people of the earth.

They speak of the "white race," the "black race," the "yellow race." In that way they try to separate peoples by the colors of their skins.

Sometimes we say the "English-speaking" race, or the "German-speaking" race, or the "Italian-speaking" race, and the like. In that way we try to separate peoples by the languages they speak.

And there are still other ways in which the word *race* is used to tell one group of people from another, but we shall not speak of them here.

Of course all these ways cannot be correct. We should use the word *race* to mean just one thing, if we use it at all. Is there one best meaning? Let us see.

Can We Separate People by the Colors of Their Skins?

An interesting exercise would be to try to make a "skin-color" map of the world. If you did that, you would color most of Africa black, because Africa is called the home of the Negro, or black race. You would color Mongolia, Tibet, China, Japan, Indo-China, and certain surrounding lands light yellow, because there is the home of the yellow races. India and surrounding lands, Malaya, Netherland India, the Philippines, and other Pacific islands, would be colored brown, because there live most of the brown race. Small parts of the Americas would be copper-colored, because they are said to be the home of the red race. You would leave Europe, western Asia, northern Africa, most of the Americas, Australia, and New Zealand white, because that general region is called the home of the white race.

If you did that you could make a good-looking and interesting "race map" of the world. But it would not be a very accurate one.

Why? Because the peoples of the world cannot be divided up so sharply by the color of their skins. For example, we have said that Africa is the home of the blacks. But you know that all the black people do not live in Africa. Far from it! In the United States alone live 13,000,000 blacks! Many live in the islands of the oceans.

Moreover, all the inhabitants of Africa are not black people. Many who live in Africa are whites or browns. And no one knows how many people — probably millions — live there who are partly black and partly white.

Whites and blacks have lived side by side in different places for thousands of years. Some of these have married and had children. That happened in Africa, Arabia, and other parts of western Asia where the white Arabs married Negroes.

Their children became mixtures of black and white, and the color of their skin has become a much lighter brown than that of the other black people of Africa.

Moreover, several million white people also live in Africa. The British and Dutch who live in the Union of South Africa are as light-skinned as their cousins in Europe. The Egyptians and Berbers of the Mediterranean coast, on the other hand, are very, very dark, almost black.

Do you see from these brief examples how difficult it would be to separate the peoples of Africa by their skin-color, how difficult to say of each group: "These belong to the white race" . . . "these, to the black race," and so on?

The problem is even more mixed up in Asia. Living in India are 325,000,000 people with very dark-brown skins; in fact, some have really black skins. Yet millions of these peoples are more directly related to the whites of Europe than they are to the blacks of Africa. There are other millions of brown-skinned and black-skinned peoples mixed up together in Burma, Siam, Indo-China, Malaya, the Philippines, Sumatra, Java, Borneo, New Guinea, Fiji, Samoa, Hawaii, and other Pacific islands. Some of these resemble the African Negroes, while others look more like the people of India and near-by regions.

Or take the yellow race of China, Japan, Mongolia, Tibet, and other parts of eastern Asia. Here are 600,000,000 people, nearly a third of the people of the earth! In some ways these people appear to belong to one group. The shape of their faces and eyes is much the same, and the hair of practically all the people over the whole vast region is smooth, shiny black. In many ways they appear to have come from the same ancestors. But do they all have the same color of skin? No, indeed! There are vast differences among them. Some are very dark, almost black. But most of them have skins that are no more yellow than are those of many Americans or Europeans.

From these brief examples what do we conclude? Can we divide the two billion (2,000,000,000) people of the world sharply into races by means of the colors of their skins? Does it not seem to be a very unsure way to decide what race a person belongs to? Perhaps we can sum up the discussion this way.

First. In certain continents today most of the people do seem to have about the same color of skin. In Africa most of the people are very dark — almost black. In Europe and North America most of them are light — almost white. In northern and eastern Asia most of them have almost yellowish-colored skin.

Second. But in every one of these places the differences among the people are so very great that skin-color alone does not make a sure test of race.

Can You Separate Peoples by Their Heights, Faces, Hair, or Other Things of the Body?

Can you tell from a person's height of what race he is? Even within the same family there are enormous differences of height among children. Within a town the differences are even greater. Look about you in your own community. You will see a few very tall men — over six feet in height; a few as short as five feet; and a great many of middle height, perhaps five feet six or seven inches. The people of any American community differ very much among themselves. The same is true of a British or German, Scandinavian, Russian, or Chinese community. But the average heights in these countries would not be very different. Is it not clear, then, that it would be very difficult to tell what races people belong to by their heights?

Or take the question of hair. There are many different colors and kinds of hair. Some hair is fine; other hair is coarse.

Some hair is blond and some is black, and there are many shades in between. There are large regions in which the people have much the same kind of hair as those of other regions. For example, it would be very difficult for you, if you could not see his face, to tell an American Indian from an East Indian or from a Chinese or from a Malay just by his hair. Some peoples, such as the African Negroes and the primitives of the Andaman Islands in the Bay of Bengal and of Fiji and other Melanesian islands in the Pacific, all seem to have the same kind of hair. Perhaps scientists could find differences among them by means of exact measuring instruments, but just by looking at them we could not. Is it not clear that the kind of hair or its color alone is not enough to mark out a race?

What about shape of face? The answer here is much like that in the case of heights and skin-color. There do appear to be clear differences between peoples living in distant regions. Study the eight faces shown in figure 78. Compare the Mongolian-Chinese face with that of the Negro or the Nordic. If you looked at a million Chinese faces, you would see certain resemblances among them all — the shape of the eyes and cheekbones especially. A million Negro faces would show similarities of shape of nose, lips, ears, and general outline. There would be fairly clear resemblances among them, and fairly clear differences between them and other peoples *who live far away.* But it would be much more difficult to tell a Swede from a German, a Frenchman from a Spaniard or an Italian, a Russian from a Finn or a Lithuanian. Some among them would show clear differences, but many would not.

What, then, is the best single answer we can give to our question? Can you tell differences in race by differences in skin-color, in hair, in height, weight, shape of face and head, and the like?

It is not easy to sum up the whole discussion briefly, but this much we can count on.

First. One cannot tell a person's race by any one thing, such as skin-color, hair, or shape of face. The differences in these respects between the people living in any region are too great.

Second. Nevertheless certain peoples who live in some regions of the earth do show marked bodily differences from those who live in other regions. Taken all together, — skin, hair, shape of head and face, and other things, — these body characteristics seem to tell us that long ago mankind became divided into several groups.

Third. Long, long ago these great divisions lived in different regions of the earth.

Fourth. In spite of an enormous amount of moving about from continent to continent, in spite of millions of marriages between persons of different divisions, most of the people of Europe, Asia, and Africa even today appear to belong to fairly separated divisions.

The Dictionary Definition

If you will look in the best dictionaries, you will find many ways of defining race. But the one that students of the problem use is like the one given in the Oxford dictionary. According to that a race is "one of the great divisions of mankind, having certain physical peculiarities in common."

Let us use this definition unless we can make a clearer one.

The Ancient Races of Mankind: What Were They? Where Did They Settle?

The "great divisions of mankind," the dictionary says. Mankind does indeed appear in certain great divisions. Careful students of these matters have studied the problem of race for a long, long time. As a result each one[1] has stated what he regards those "great divisions" to be. They do not agree exactly among themselves in all respects. But, as we said in Chapter IV, they do agree fairly well on certain things. First, they think that long, long ago the ancient ancestors of modern peoples started out from south-central Asia and wandered over the face of the earth (figure 30 shows how an artist imagined the great wanderings). In the thousands of years that passed they finally settled down in the general regions marked on map 8. Study this map carefully, remembering that it shows only in a very general way where it is thought that these very primitive tribes settled.

We can be fairly sure of seven great divisions:

1. *The Negro Race: Central Africa*

Certain black-skinned and kinky-haired peoples settled in Africa. They became more and more like one another and less and less like other peoples far away. Although some of them wandered across the Indian Ocean to India and even out to the islands of the Pacific, Africa was for long the home of these people.

2. *The Mediterranean Race: Northern Africa*

Another division of mankind, with straight black hair and slightly dark but not black skins, settled south and east of the Mediterranean Sea in northern Africa and Arabia. Although these people have dark skins and very dark eyes and straight black hair, they are called white. Today their descendants are scattered over northern Africa and the Near East and are to be found in Spain, France, Italy, and other parts of southern Europe, as well.

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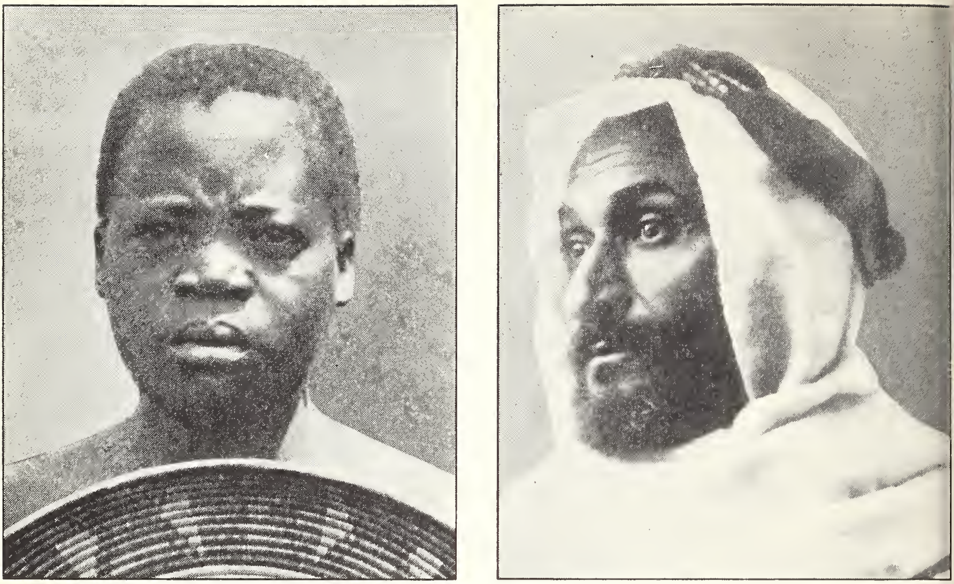
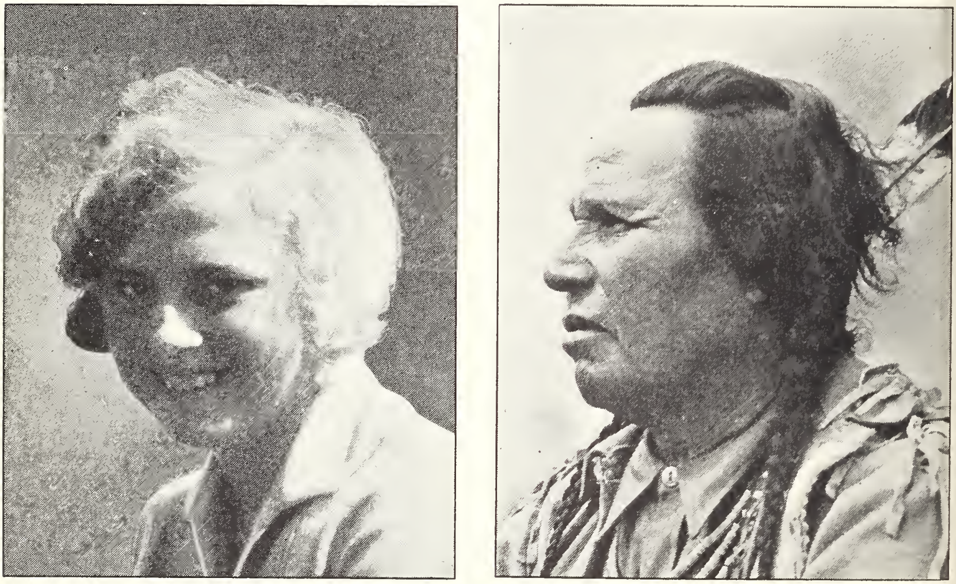
[1] We shall follow the agreements of such students as Sir Grafton Elliott Smith, the late Professor James Breasted, Sir Leonard Woolley.



Underwood and Underwood

Negro

Semitic



Nordic

Ewing Galloway

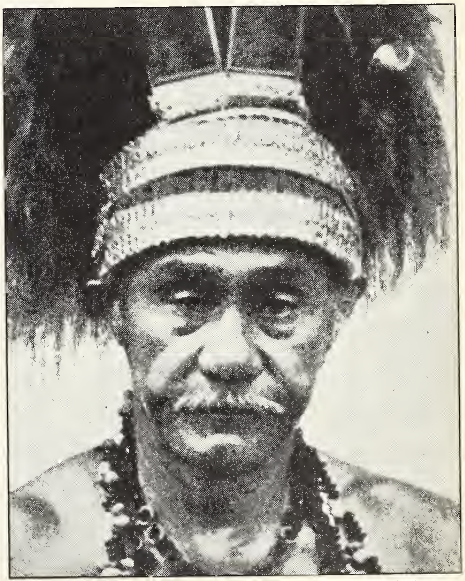
Amerindian

FIG. 78. These people belong to different "races" on the earth. Can you describe

Mediterranean

Hamitic

Mongolian



Ewing Galloway

Polynesian

them in terms of skin-color, of texture and color of hair, of shape of face and head?

3. *The Nordic Race: Northern Europe*

A third division of mankind, with very fair skin, light hair, and blue eyes, settled in northern Europe. We call them white and regard them as one of the chief ancestors of the present northwest Europeans, including the British and most of the people in the United States.

4. *The Alpine Race: Western Asia*

A fourth division, also called white, settled in the general region east and north of the Caspian Sea and east of the Ural Mountains. Some students think they went as far west as the plains of Hungary in Europe. At any rate, later, — perhaps 10,000 years ago, — many of these were living in central Europe and had settled, in general, between the Nordics and the Mediterraneans. They too are the ancestors of some of the Americans of the United States today.

5. *The Mongol Race: Central and Eastern Asia*

A large division of light, yellowish-skinned peoples with straight black hair, black eyes, high cheekbones, and "slant" eyes settled in the region included in the present Tibet, Mongolia, and China, Japan, and Indo-China. From these came, by many marriages, the Chinese, the Japanese, and other related peoples of today. Today we call them the yellow race, although the skins of most of them are very light.

6. *The Australian Race: Australia and Near-by Islands*

The sixth division: a smaller group of kinky-haired, black-skinned peoples (resembling the Negro division more closely than any others) which wandered down from central Asia to the region now called Australia, Tasmania, New Guinea, and the near-by islands of the Pacific. Today only a small number of their descendants are living, and these are about the most primitive of any peoples on the earth. We call them black.

7. *The Amerindian Race (American Indian): North and South America*

A fairly large division of people with copper-colored skin, black hair, high cheekbones, and Mongol-like faces who are believed to have crossed from Asia to North America during one of the interglacial periods and settled in many scattered parts of North and South America. They probably were the ancestors of the Maya, Aztec, and other tribes in North America, and of the Inca peoples in South America, who were called Indians by Europeans in the 1500's and 1600's. Today there are about 400,000 descendants of these people in the United States and many millions in Mexico and in Central and South America.

Where the Races Were Living in the New Stone Age

Scientists feel fairly certain that these seven divisions of mankind were living in these centers as long ago as the Old Stone Age. We can be very sure indeed that peoples like them in many ways — in color of skin, hair, and eyes, in shape of head and face — are living in these regions today. That is, there are millions of Negroes in Africa, millions of Nordics in northern Europe, millions of Mediterraneans around the Mediterranean Sea, millions of Mongols in Asia, and millions of Amerindians in the Americas.

But from figures 28 and 29 we find that certain important changes had already taken place. The great ice sheets had moved down over Europe, Asia, and North America. We think that these ice sheets could not have interfered with the

Negroes or the Mediterraneans or the Australians at all. But they had separated the Mongols and these others from the Nordics and the Alpines. These two divisions may indeed have been forced southward for many thousands of years.

We can feel sure that during all that time these seven divisions lived on and on, each generation of children leading about the same kind of life as their fathers and mothers had before them. Although throughout most of that time they were food-hunters and therefore wandered about quite a bit, it is probable that most of them stayed within these large regions. This, perhaps, is the chief reason why there are such clear resemblances even today among the people of any one of these seven divisions. That is, a Negro looks more like another Negro than he looks like a Nordic or a Mediterranean or a Mongol. A Mongol looks more like — in fact, is more like — another Mongol than like a person of another division. The same thing is true of each of the other races.

So much we can count on in a general way concerning the division of mankind into races.

Each of These Seven Races Slowly Divided into Many Separate Peoples

But even by the time of the New Stone Age (about 20,000 to 10,000 B.C.) these large groups had divided and subdivided. People of different tribes had met one another in their wanderings. Men of one group married women of another. As they moved slowly from place to place their children and their children's children for thousands of years married with children of other groups. Slowly they became more and more mixed up. Colors of skin, hair, and eyes slowly changed. Among the seven great divisions, or races, heights, weights, and shapes of head, face, and body, slowly changed. Thus as time went on, century after century, there developed hundreds, perhaps thousands, of small differences in each of the separate races of the world. Tribes showed certain differences. Clans showed differences.

Especially was that true after the first river-valley civilizations developed after 4000 B.C. For although they settled down in certain "homelands" after they invented agriculture and other civilized arts, yet the wanderings of some people among them increased very much. Travel and trade grew. Animals were tamed and trained to carry people over land. Ships were invented and used for travel on the water. The natural resources and the goods of one part of the world were desired by people in other parts.

So, more and more, the peoples of the earth separated into tribes and clans. At last, by the time of Egypt, Babylon, and Assyria, groups had developed that appear to be much like our nations today.

We Shall Now Hear about a New Grouping of Peoples

With this much knowledge of races, we can turn now to the peoples who were settling in Europe while the Egyptians and the Mesopotamians were building the first real civilizations. We turn to the Europeans because from now on we shall be studying how our European-American civilization grew. As you know, most Americans are whites, and they or their ancestors came from Europe. Hence it is very important for us to know where European civilization came from.

Three White Races — Nordics, Alpines, and Mediterraneans — Were Settling Down in Europe in the New Stone Age

As we learned in Chapter V, the New Stone Age peoples were scattered all over Europe from at least 20,000 B.C. down to 6000 or 7000 years ago. However, we know of no "civilized" ways of living in Europe that can be considered as advanced as those of the Egyptians during that time. We know that the lake dwellers and other New Stone Age people were living on "stilts" above the streams and lakes of middle Europe some 7000 to 10,000 years ago. They had herds of cattle, sheep, goats, and pigs, and they tended crude garden patches. These peoples were whites and probably came from three of the seven great races — Nordic, Alpine, and Mediterranean.

1. *The Nordics*

The tall, fair-haired Nordics had lived in northern Europe from the days when the ice sheets had melted. They probably went there after plants again began to grow and animals could graze upon the land. It was they who moved into the Scandinavian peninsula and the region where Germany is today. After several thousand years their descendants probably became the Swedes, Norwegians, Danes, and Germans of today. Whether they were as blond and blue-eyed 10,000 years ago as they are today, we are not sure. Some scientists think they were. Some believe that the peculiar climate, the soil, and the food they got there, gradually bleached their skins and hair. Certainly all that is said of them in the records of 1500 years ago leads us to think that they have been fair-haired and light-skinned for a long, long time. Some of these came to America in the 1700's and 1800's and helped to settle our own country.

2. *The Alpines*

The second white race in Europe had lived in western Asia, just east and north of the Caspian Sea, for no one knows how long. Slowly, very, very slowly, as many thousands of years passed while the ice sheet on the high mountains south of them and the ice to the north of them melted, they wandered westward. Many of them probably lived on the plains of Hungary. How long it took, we do not know. But at last, perhaps 10,000 years ago, Alpine peoples were living across middle Europe probably as far west as present France and Switzerland.

Although these Alpines were whites, they were definitely of darker skin-color than the Nordics, and their eyes were dark also. Their hair was not as straight and black as that of the Mongols or the American Indians, but it was much darker than that of the Nordics. Why? What made it so? We do not know. We only know that even today the peoples who live in the middle section across Europe are generally darker than the Germans and Scandinavians of the northern section. Some of the descendants of these Alpines also came to North America at different times after 1600 to help make our own country.

3. *The Mediterraneans*

South of the Alpines, along the Mediterranean Sea, lived the Mediterraneans. They were scattered from Spain across southern France, Italy, and around the Near East. These Mediterranean people were the darkest of all the whites of Europe. You can picture how they may have looked if you will contrast in your mind a Spaniard or an Italian (Mediterraneans) of today with a Swede or a Norwegian (Nordics). Most of the Mediterraneans are very dark-skinned, with black eyes and straight black hair. Figure 78 will show you an example. We know that the Mediterraneans of Africa of Old Stone Age times had moved northward. Those who had formerly lived across northern Africa had moved up into Europe. How they got there, we do not know. Some scientists think that at that time the Mediterranean Sea was all dry land covered with grass. Slowly, they say, the Mediterranean herdsmen moved northward into what is now Europe. Later, as thousands of years passed, the Mediterranean Sea filled in.

Others think that the sea was there all the time, but that there was a bridge of high land extending down from Italy and joining the African continent. They think that the Mediterranean peoples moved slowly over that into what we call Europe.

No matter how they got there. We know that by the end of the New Stone Age in Europe — let us say by 3000 B.C. — white people of three races were living all over Europe. There were blond Nordics in the north. There were darker Alpines in the center. There were very dark Mediterraneans in the south. We feel very sure that these were among the ancestors of our Euro-Americans of today.

Now We Shall Hear of Other Ancestors of the Europeans

But in addition to these three, there were others. Far to the east of Europe, near the Caspian Sea, was another group of white peoples who were to help make the great European civilization of today. During the thousands of years in which the Hamites and Semites were inventing the new civilizations in Egypt and Mesopotamia the whites of western Asia were unknown to them. But we know today that these tribes of western Asia were the ancestors of one of the most important groups of peoples that has ever lived on the earth

In Chapter XII we shall begin reading their story.

Books You Would Like To Read

Clark, V. B. Europe. Silver, Burdett and Company, New York.
Cole, Walter. A B C Book of People. Minton, Balch & Co., New York.

CHAPTER XII

The Indo-Europeans: More about Our White Ancestors

For the next chapter in our story of civilizations we return to western Asia. Not to Mesopotamia or the eastern coast of the Mediterranean, but to the lands north and east; for there the ancestors of the most important single people in the world today were living. These were the people we call Indo-Europeans.

Perhaps you are asking, "Are they still another race?" No; they form an even bigger group than any one of the seven great divisions of mankind. Actually they include people from three of the seven ancient races — the Alpines, the Nordics, and the Mediterraneans. And they live over an enormous territory; in fact, there are large numbers of Indo-European people living in every continent of the earth today. We shall see, then, what a very important part these Indo-Europeans played in the story of civilizations.

To do so we must go back to their ancestors of several thousand years ago.

An Important Region: Asia Minor and the Plateau of Iran

On map 7, page 149, find the mountainous region that includes Asia Minor and the plateau of Iran. Between the Aegean and Mediterranean seas of the west, the Black and Caspian seas on the north, the high Himalaya Mountains on the east, and the Fertile Crescent and the Persian Gulf on the south, is a vast mountain plateau. This highland is 2000 miles long and from 300 miles to 700 miles wide.

Note that the seas and the mountains divide it into two large parts. The smaller, western part is called Asia Minor. That is a peninsula several hundred miles long, sticking out from the huge continent of Asia and surrounded on three sides by seas — the Black on the north, the Aegean on the west, and the Mediterranean on the south.

The larger, eastern part is the Plateau of Iran, more than 1000 miles long and very high — much of it from 5000 to 8000 feet above sea level.

Why Is This Region of Iran and Asia Minor So Important?

There are two very good answers to that question.

First, it was there that the Indo-European civilization began.

Second, these ancient Indo-Europeans were among the first to carry the new civilized ways of living into Europe and Asia. That is, the region of Iran and Asia Minor was a kind of "steppingstone" over which civilization was carried from the great centers of the Near East.

Down from this mountain plateau, 4000 years ago, came some of the most advanced white people on the earth. Down the valleys they came, conquering the peaceful farming and village people of the Fertile Crescent.

How These New White Peoples — the Indo-Europeans — Developed

Their Ancient Ancestors

We have space here only to outline the long and exciting history of the white peoples of Iran. First we ask, "Who were the parents of these white Asiatics?"

Of what happened before 3000 B.C., we do not know. We only know that long before that time scattered tribes of New Stone Age peoples were tending their herds and flocks on vast grassy steppes east of the Caspian Sea. They lived partly settled lives, raising some food from the earth, hunting, and fishing. That they were advancing toward civilization we also know, for they made tools and implements and ornaments of copper. They had tamed horses which they rode as they wandered from place to place, tending their herds. Moreover, they had learned to make and use the wheel, for they had wheeled carts with horses to pull them.

Were they descendants of the ancient Mongol or Australian or Amerindian races? No; we feel sure that they were whites. Were they Alpines? It is more likely, although we cannot be sure even of that. At any rate these scattered white tribes are believed to be the ancient ancestors of the new whites who moved slowly across the high plateau of Iran and settled in Asia Minor by 3000 B.C.

That they were a warlike people we can be quite sure; for they attacked the settled villages of Mesopotamia from time to time. That they slowly learned about agriculture and toolmaking from the advanced peoples of Mesopotomia, we can also be fairly sure. But no trace has been found of writing or records, or of large permanent buildings. We do not know whether they lived in cities, or much about their government and their arts before 3000 to 2000 B.C.

About 1800 B.C. Tribes of Aryans Started East and West, Making Conquests and New Settlements

The story begins with white tribes called Aryans.[1] The habit of calling the whites of Europe, America, and other continents "Aryans" spread and spread until today many people wrongly

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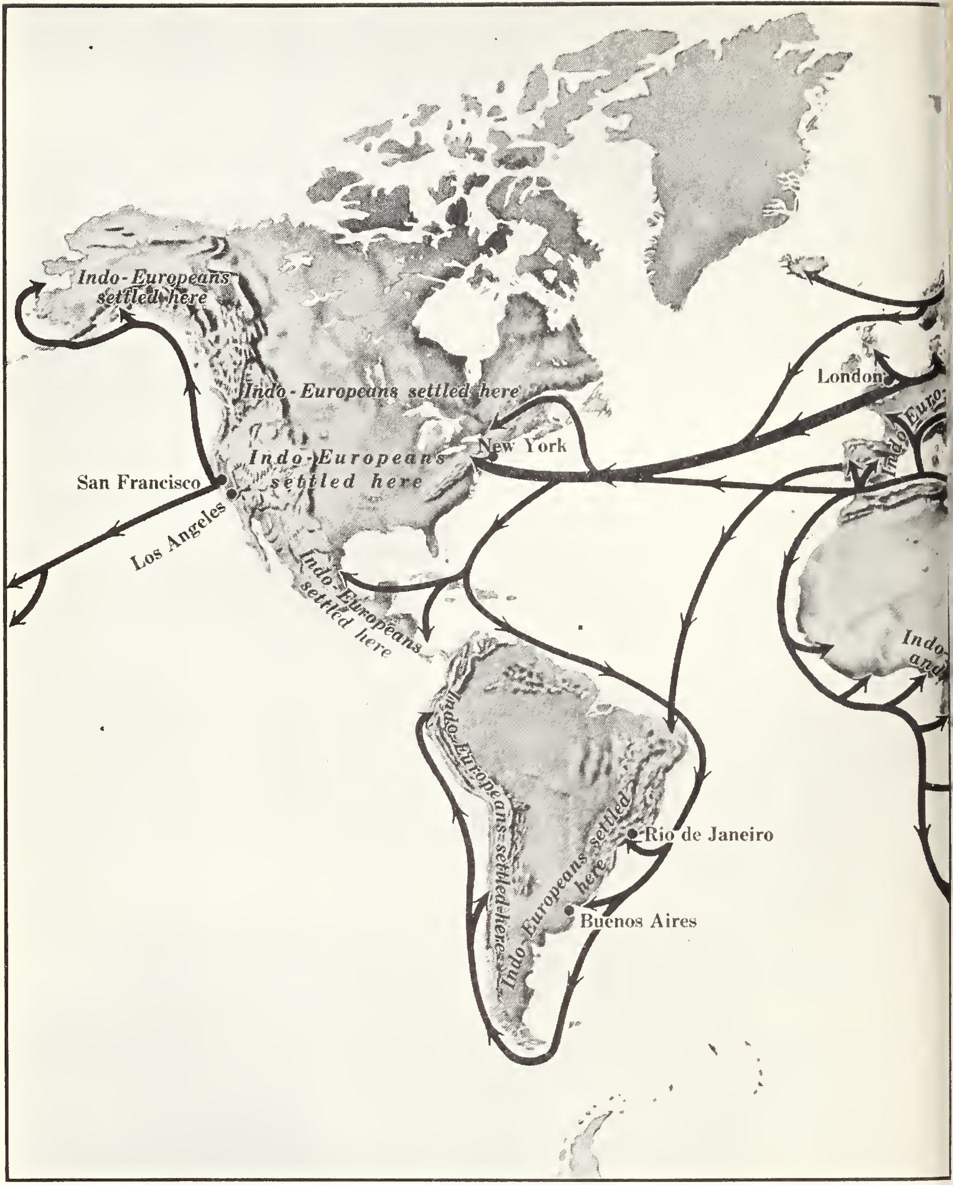
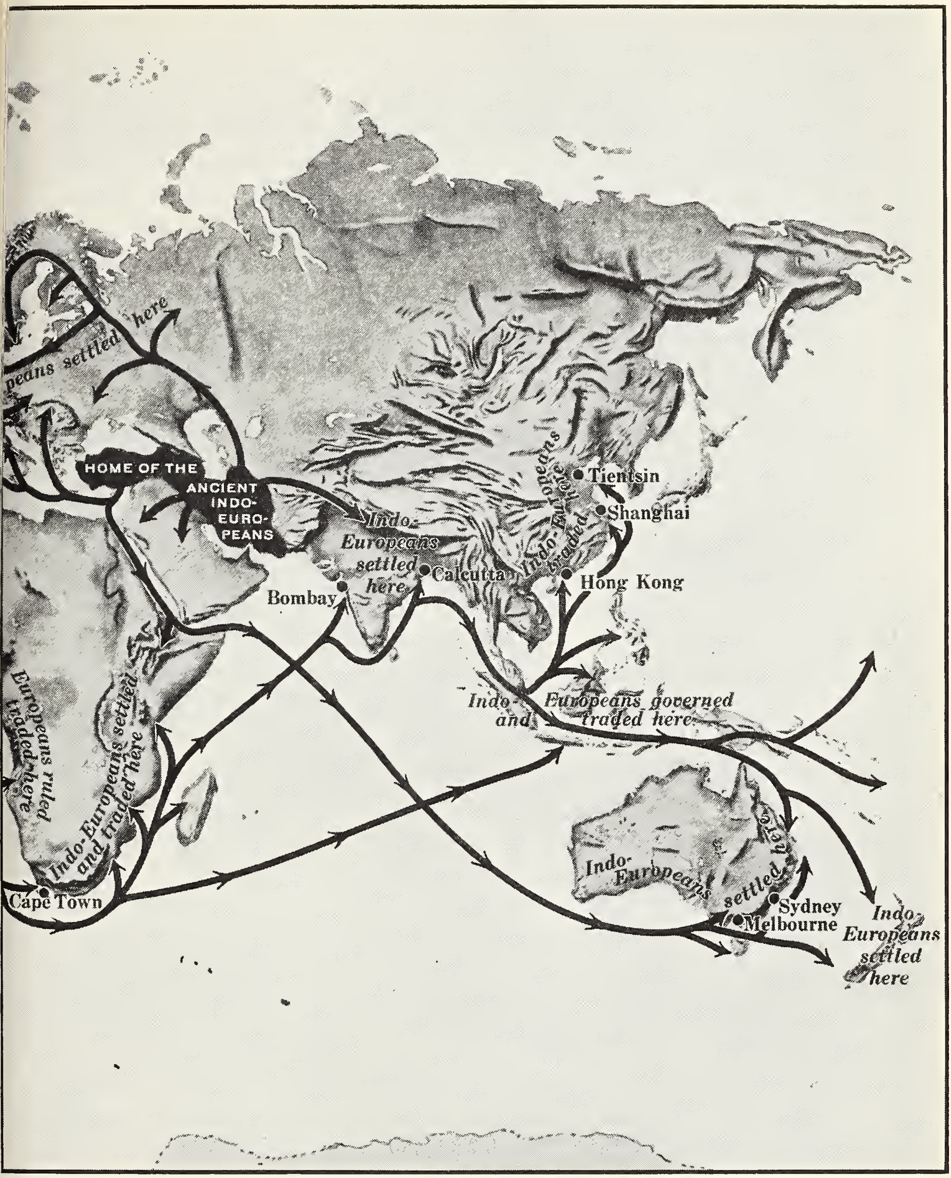
[1] Pronounced ar′yanz.


Indo-Europeans settled here
Indo-Europeans settled here
Indo-Europeans settled here
San Francisco
Los Angeles
New York
London
Indo-Euro
Indo-Europeans settled here
Indo-Europeans settled here
Indo-Europeans settled here
Rio de Janeiro
Buenos Aires
Indo-
and

Map 8. The outward movement


peans settled here
HOME OF THE ANCIENT INDO-EUROPEANS
Indo-Europeans settled here
Calcutta
Bombay
Tientsin
Shanghai
Hong Kong
Indo-Europeans traded here
Indo-Europeans governed and traded here
Europeans ruled traded here
Indo-Europeans settled and traded here
Cape Town
Indo-Europeans settled here
Sydney
Melbourne
Indo-Europeans settled here

of the ancient Indo-Europeans

think that there was *one* ancient tribe which was the *parent* of European peoples.

What are the facts as scientists piece them together? They are not absolutely clear, but it seems that we can depend on this much.

As long ago as 2000 B.C. — perhaps much earlier than that — certain tribes of wandering herdsmen on horseback, living on the grassy plains east of the Caspian Sea, were called Aryans. For some unknown reason some of these tribes moved out of their homelands and wandered in various directions. One group moved slowly southeastward and finally crossed the great mountains to settle in what is now northwest India. There they slowly built up a better civilization, developed agriculture and industry, and learned writing and the arts.

We know that these Aryans settled in India, because in their books, the *Vedas*, is the story of their ancient life on the steppes of Asia. The *Vedas*, which were written in the Sanskrit language, have been translated by modern scientists. These scientists have found that many words in Sanskrit are very much like words in Persian, in Greek, in German, in French, in Italian, in English, and in other European languages.

Other groups — either Aryans or related to them — went southward and westward across the plateau of Iran.

Thus, in the years from 2500 B.C. to about 600 B.C. tribes of peoples were constantly conquering and settling, conquering and settling, in Mesopotamia and Asia Minor, on the islands and on the mainland of Europe. Indeed, they reached down into the empire of Egypt, at the head of the Mediterranean Sea.

Remember, as we study their story, that it is the story of the beginning of the advance of a new group of people. They were white people who in the 3000 years from 2500 B.C. to 500 A.D. settled all the way from northwest India across Europe to Spain, the British Isles, and Scandinavia. We shall not call them a race, for they include people of several races.

They have all come to be grouped together and to be called Indo-Europeans. We use the word Indo-Europeans especially because their languages all belong to one great family. Some, the Indians of the East, certainly were Aryans; the others, who settled into Asia Minor and Europe, may have been. At any rate, they were cousins. We can see, then, that the Indo-Europeans must have included people of two of the seven great divisions of mankind, two of the three white races of Europe — the Alpines and the Nordics. Perhaps they included some of the Mediterraneans also, but of that we cannot be sure.

To a brief sketch of these ancient ancestors of our Indo-European ancestors in Iran and Asia Minor, then, we turn next.

1. The Hittites in Asia Minor, 2500 to 1000 B.C.

By 2500 B.C. some of the Indo-European tribes had settled in the mountain valleys along the Halys River (map 7, page 149). These northern people were the ancestors of the Hittites mentioned by the Hebrew writers of the Old Testament of the Bible. They were a conquering and vigorous people who lived far to the north of the Jews of Palestine. Find the Hittites on map 7, stretching in scattered tribes across Asia Minor, just north of the Fertile Crescent and south of the Black Sea and the Caucasus Mountains. (A still more ancient name for this whole region was "Anatolia." This name is sometimes used even today for a part of this region. Asia Minor is now, however, the modern nation of Turkey.) To the south, along the Fertile Crescent, were other Caspian horsemen, the Mitanni.

For the next 1500 years, while Babylonia was building up very advanced ways of living, the Hittites slowly learned from them. As time went on, Babylonian and Assyrian merchants sent trading caravans back and forth from their Fertile Crescent towns to the Hittite communities in Asia Minor. Gradually the Hittites learned the settled ways of agriculture, housebuilding, pottery, weaving, and government of the Mesopotamians. They even learned the art of writing on clay tablets, using the cuneiform style. Slowly they invented an alphabet and a written language of their own. By 2000 B.C. they had become a very civilized people.

Being a more warlike group, however, they gradually conquered the peoples of the fine river-valley civilizations of Mesopotamia. A full history of the Hittites would tell the story of their two great empires. The first empire lasted from about 1900 to 1650 B.C., under such kings as Mursil I. In 1750 he captured the city of Babylon. The second empire started about 1400 B.C. and lasted until about 1200 B.C.

In this book we cannot tell more of these Hittite kings and their armies that conquered and held most of the Near East for a while. Remember that they were the first important group of ancestors of the people we call the Indo-Europeans today. *Their land was the first steppingstone across which the advanced civilized arts of living developed in Egypt and Mesopotamia were carried up into Europe.*

The Famous Iron Region of Asia Minor

But remember the Hittites also because they were one of the earliest peoples to make much use of iron. Notice on map 7 that the region just south of the Black Sea is marked Iron Region. Here the ancient peoples had discovered rich deposits of iron ore. For how long they had worked these, we do not know. As late as 2000 B.C. iron was regarded as a very precious metal. It was worn by rulers in ornaments, much as gold is today, so it could not have been mined in large amounts. By 1400 B.C., however, the Hittites had built up a rich iron industry the fame of which had spread all over the Near East.

Ewing Galloway

FIG. 79. As an artist imagines the marriage of the Indo-European King Alexander in Persia in the third century B.C.

2. The Medes and the Persians, 700 to 330 B.C.

The only other Iranian peoples we need remember in this outline of ancient civilization are the Medes and the Persians. These were two powerful tribes that settled long, long ago in the mountains of Iran between the Caspian Sea and the Persian Gulf. Slowly they extended their rule over people around them, but not until about 700 B.C. did the Medes have a strong empire. At that time they ruled most of Iran and Asia Minor and much of the Fertile Crescent. In 612 they conquered the great city of Nineveh on the Tigris River (opposite the present great oil center of Mosul).

The Persian Empire Finally Included All the Near East

The power of the Medes soon dwindled, however, to give way to the Persians under strong rulers like Cyrus. Cyrus, who conquered Babylon in 538 B.C., is regarded as the first important Indo-European conqueror in history. In the next thirteen years the Persian armies advanced across all the Fertile Crescent, Asia Minor, and down the Mediterranean coast. In 525 B.C. they conquered Egypt.

Ewing Galloway

FIG. 80. King Cyrus of Persia and the people before him are Indo-Europeans of the sixth century B.C.

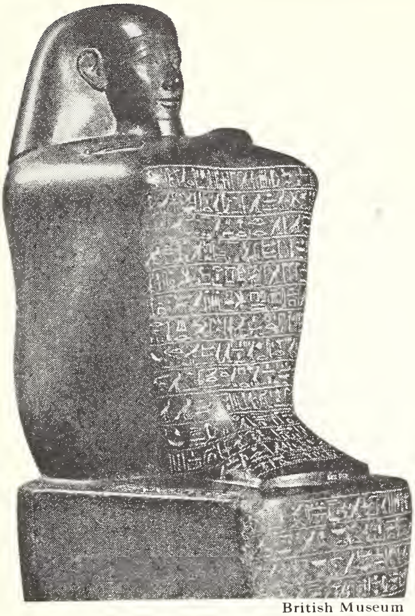
Here, then, in the whole Near East from Egypt to Iran, during the next 200 years was built up the Persian civilization. Not much new was invented; the Persians imitated the Babylonians and the Assyrians. They built great palaces and other public buildings. They developed large cities and towns. They carried on trade all over the Near East. They employed two written languages — their own Persian and the Aramaic of the ancient merchants of that name.

A Great Religion Taught by Zoroaster

One other thing they are remembered for — the building up of one of the very first great religions of the world. This was the work of a religious thinker called Zoroaster, who, it is believed, lived about 600 B.C. Instead of worshiping many gods, as had the Egyptians and the Mesopotamians before them, he taught his people to worship a single God of Goodness and Light. He showed them that they must choose between Good and Evil. His words were passed on from person to person. Some were written down in a sacred book called the *Avesta*, which we think of today as the Persian Bible. By 500 B.C. — that is, 500 years before Christ — the teachings of Zoroaster had become the religion of the Persians. It was accepted by the rulers as well as by the masses of the people. This was indeed one of the first great religions of mankind.

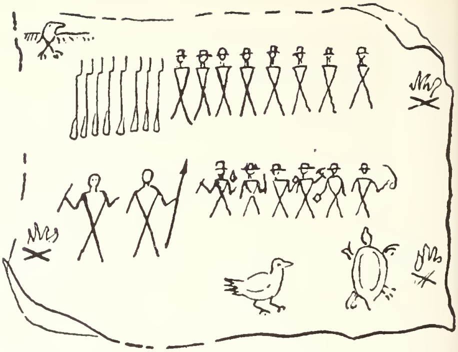
The Persian Empire kept peace in the Near East for about 200 years. Its territory was extended under the famous king Darius (521–485 B.C.), even into Europe, up the valley of the Danube River. It spread to the doors of a new and powerful people, the Greeks, of whom we shall very soon learn amazing things.

But before we turn to the doings of the Indo-Europeans in Europe we must study one other chapter of the story of advancing civilization. That is the wonderful story of language, which we shall outline in Chapter XIII.

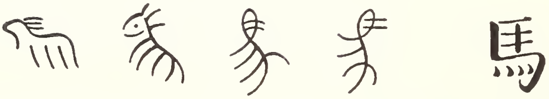


British Museum

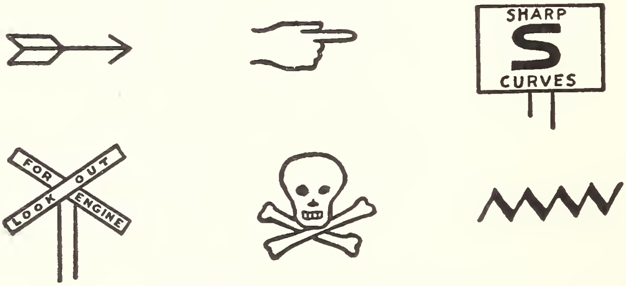
Hieroglyphic writing on an Egyptian statue. If you look closely you can see some of the separate ideographs



Picture-writing given by the Indian guides to their tribesmen



How the present Chinese sign for "horse" developed from a picture



Idea signs that are in use today

Fig. 81. Examples of picture writing

CHAPTER XIII

The Languages of Mankind

In *Man at Work: His Arts and Crafts* (Chapters XV and XVI) you read the story of how primitive peoples may have developed languages tens of thousands of years ago. If you need to refresh your memory, read it again at this point, for we must not use the space in this book to repeat it. All we need say is that by the New Stone Age, peoples in many parts of the world had learned how to communicate with one another by means of oral, or spoken, language. How these languages first arose we do not know exactly. We know that there are at least 2000 tribes and 74 countries on the earth today. The people in each of these speak a language and one or more dialects.

Many of these thousands of languages are closely related. The languages of eastern Asia are very much alike in some respects. The African tribes have many words in common. The Amerindian languages have common words.

Such facts have led our students to study carefully the ways in which the languages of the earth are related. As a result they have grouped them all together in a few large so-called families. Three of these are the languages of white people.

1. The Indo-Europeans, of whom we have just been reading.
2. The Egyptians and near-by peoples, who spoke Hamitic languages.
3. The Mesopotamians (Babylonians, Assyrians, Chaldeans, and Hebrews), who spoke Semitic languages.

Let us look for a moment at a language map of the world (pages 242–243) and outline briefly what these languages are.

THE LANGUAGE MAP OF THE WORLD

1. The Indo-European Family of Languages

Map 9 shows the languages of the earth grouped in eight large families. The first and perhaps most important family is the Indo-European. Notice how it stands out — a great, almost solid territory extending from India to Iceland. This Indo-European family, of course, is divided into more than 20 languages and many dialects. In the language map of Europe, only three small areas are left which are not Indo-European: the home of the Finns and Lapps in northeast Scandinavia, that of the Estonians in northern Europe, and that of the Magyars in southeast Europe.

"Can it be that all these languages are related to one another?" you are asking. Yes. The map of figure 82 gives some examples. Two words are shown as they are spelled in seventeen languages, scattered all the way from Hindustan in northwest India to Great Britain and Scandinavia. What similarities there are in *mother*, for example. In the ancient Sanskrit of distant India, *mātar*. In Scandinavia 2000 miles away, *moder*. In other European countries it is *mater*, . . . *mère*, . . . *madre*. Over much of North America it is *mother*; over much of South America, *madre*. Is it any wonder that these 20-odd languages are called a "family" — the Indo-European family?

From this example do you also see one very important reason why we speak of the peoples themselves as Indo-Europeans?

2. The Semitic Family of Languages

Map 9 shows the chief Semitic languages, Arabic and Hebrew. Arabic is the chief language spoken in Arabia,

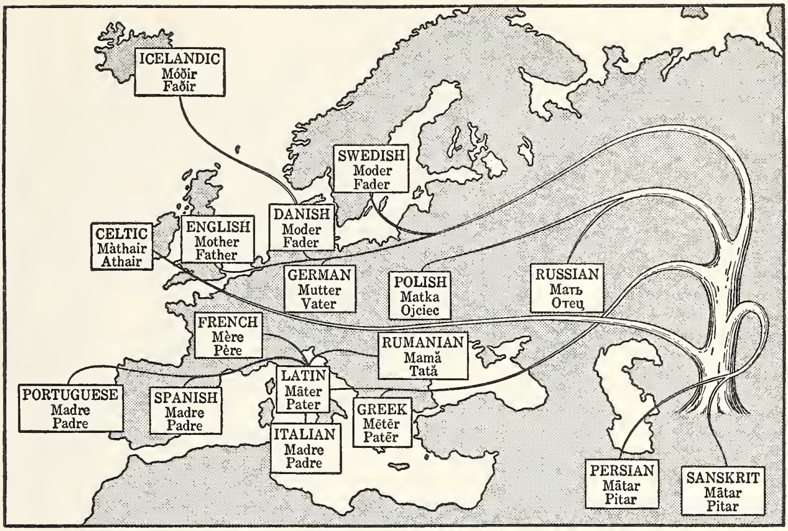
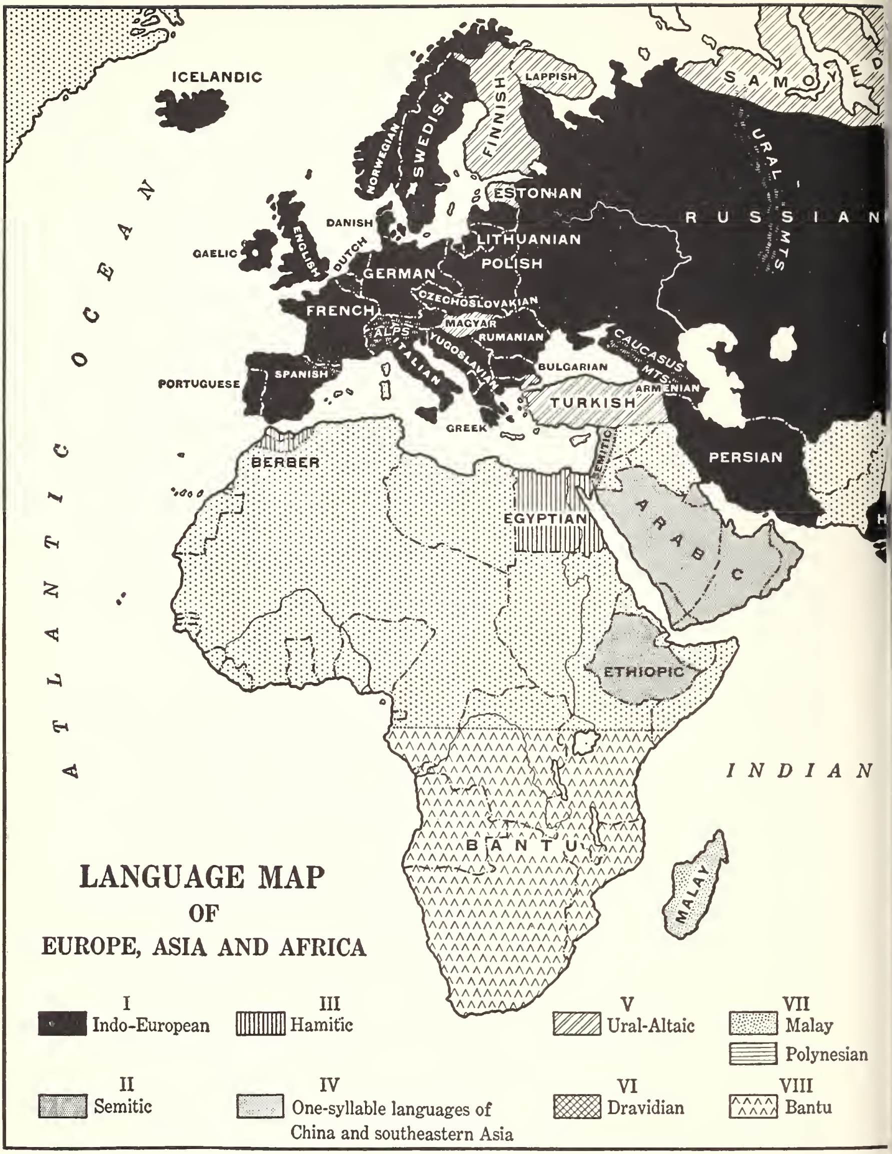


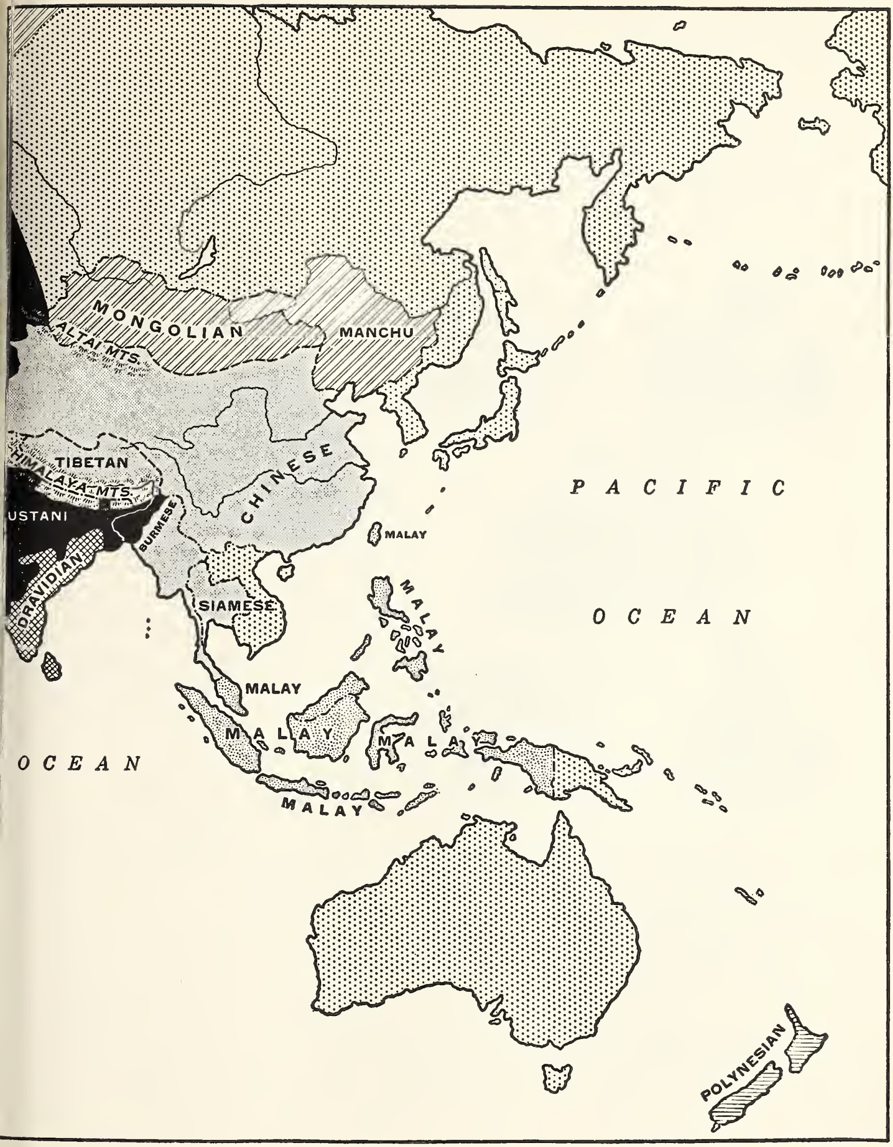
FIG. 82. A map showing how the Indo-European languages from India to Iceland are related to one another

Ethiopia, and other places near the east end of the Mediterranean Sea. In Palestine and near-by lands Hebrew, the language of the Jews, is spoken, as it also is by a few of the older living Jewish emigrants who have gone out from there to settle in the cities of the world.

"What a small space the Semitic languages fill on the map!" you exclaim. Yes, that is true today. But it was not true 3000 or 4000 years ago. Then the Semitic languages were spoken over a vast stretch of territory from Mesopotamia on the east to Spain on the west. The Babylonian, Assyrian, and Phoenician civilizations were built by peoples who were Semites. By 1000 B.C. their ways of life and their languages had spread all over the Near East and (except in Egypt) all the way across northern Africa and into Spain.


LANGUAGE MAP
OF
EUROPE, ASIA AND AFRICA
I Indo-European
II Semitic
III Hamitic
IV One-syllable languages of China and southeastern Asia
V Ural-Altaic
VI Dravidian
VII Malay
Polynesian
VIII Bantu
ATLANTIC OCEAN
INDIAN
ICELANDIC
LAPPISH
FINNISH
SWEDISH
NORWEGIAN
SAMOYED
URAL MTS
RUSSIAN
ESTONIAN
DANISH
GAELIC
ENGLISH
DUTCH
LITHUANIAN
POLISH
GERMAN
CZECHOSLOVAKIAN
FRENCH
ALPS
MAGYAR
RUMANIAN
YUGOSLAVIAN
ITALIAN
CAUCASUS MTS.
BULGARIAN
SPANISH
PORTUGUESE
ARMENIAN
TURKISH
GREEK
BERBER
SEMITIC
PERSIAN
EGYPTIAN
ARABIC
ETHIOPIC
BANTU
MALAY

Map 9



© Ginn and Company

Map 9

The Thousand-Year Struggle between the Two Language Families

In fact, for a period of more than 1000 years after 2000 B.C. these two great civilizations, as well as their two great families of languages, — the Indo-European and the Semitic, — fought for the control of the entire world about the Mediterranean Sea. For a long, long time — in fact, almost down to 100 B.C. — it was the Semites who held control. Finally, however, the Greeks and later the Romans — especially the great empire-building Romans — won. Then Indo-European peoples controlled the land from Africa north to Scandinavia, from India west to Britain. And throughout almost all this territory Indo-European languages were spoken.

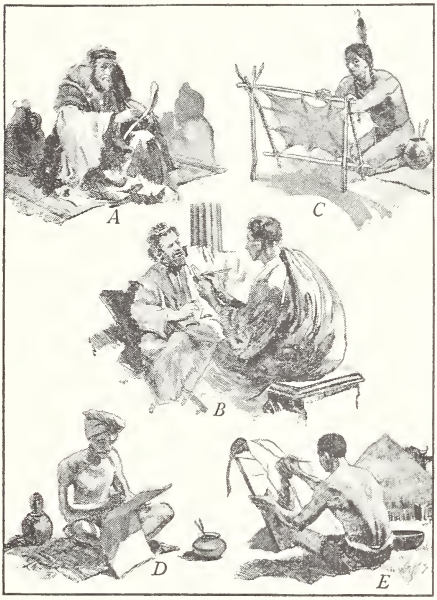


FIG. 83. As people advanced in civilization they invented some kind of written language. The picture shows them in different parts of the earth: *A*, an Arab; *B*, a Greek; *C*, a North-American Indian; *D*, a native of India; *E*, a native of Africa

Latin, the written language of Rome, became the chief language in which writing was done over the whole territory. And Latin influenced almost every modern language that is spoken today.

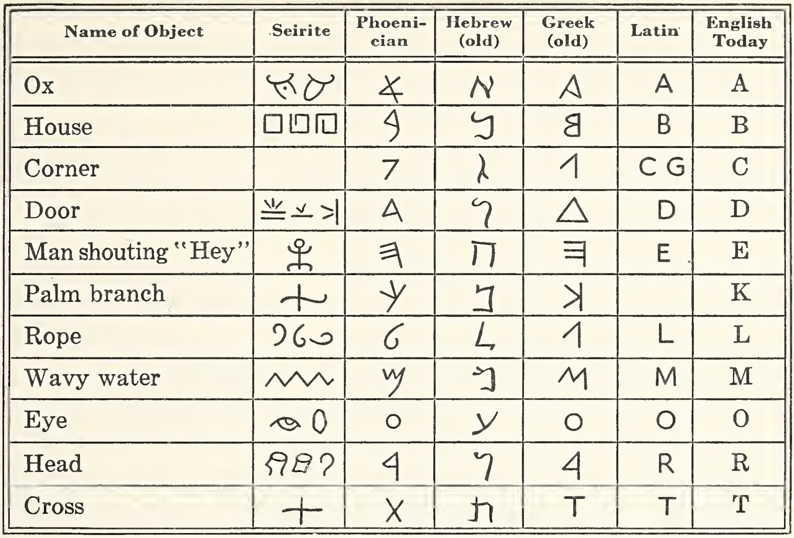

Name of Object
Seirite
Phoenician
Hebrew (old)
Greek (old)
Latin
English Today
Ox
A
A
House
B
B
Corner
C G
C
Door
D
D
Man shouting "Hey"
E
E
Palm branch
K
Rope
L
L
Wavy water
M
M
Eye
O
O
Head
R
R
Cross
T
T
T

FIG. 84. Pictures of the objects named in the first column became the letters of the Seirite alphabet, shown in the second column. Later, when other peoples made their alphabets, these letters were changed as shown in the other columns. But, as you can see, they are based on the ancient Seirite letters

3. The Hamitic Family

The third language of the white peoples is called Hamitic. It includes the Egyptian language of today, the Berber, and a few other less well-known ones. Today the Hamitic languages do indeed seem unimportant. We must not forget, however, that 5000 and more years ago the ancestor of this Hamitic language was probably one of the first, if not the very first, to be invented by human beings. Certainly we have reason to believe that it was the first one in which picture-writing[1] was replaced by "idea signs." It was the

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[1] Reread at this point and discuss very carefully Chapters XVII and XVIII of *Man at Work: His Arts and Crafts.*

Egyptians and the Seirites of the Sinai peninsula who, working together, made the first alphabet. And it was from that region at the end of the Mediterranean Sea that the alphabet spread all over the Near East and later up into Europe.

So we must remember that several thousand years ago the Hamitic and Semitic languages played a very important part in building up the modern languages which we have today.

In these three language families — (1) Indo-European, (2) Semitic, and (3) Hamitic — we have the principal languages spoken by white people around the world. About 700,000,000 people, a third of the inhabitants of the earth, speak them. Moreover, it is to one of these white peoples, the Indo-Europeans, that we owe most of modern civilization as we have it today.

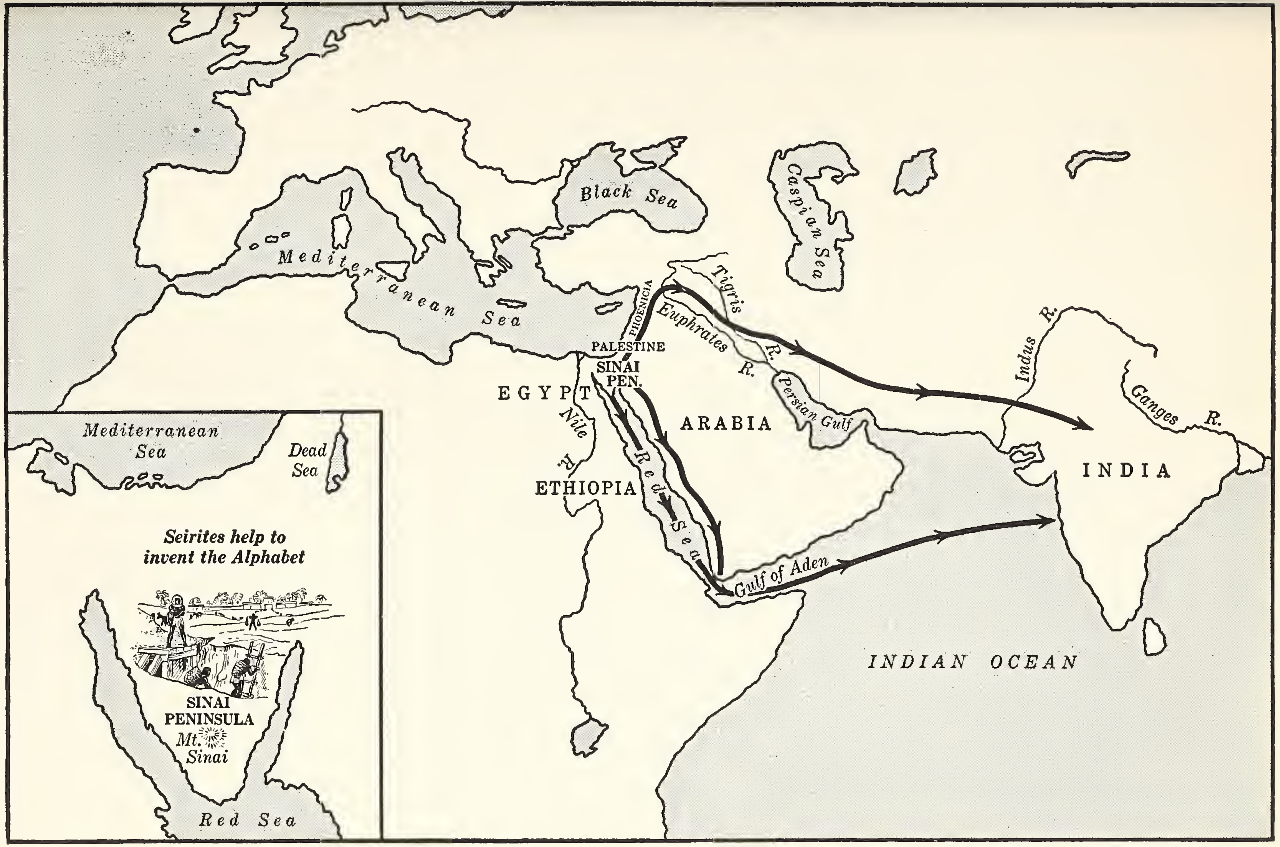
What about the other five language families? Since we shall not be studying them so closely for a long time, we shall simply name them here.

The Fourth Family. The one-syllable languages of China and southeastern Asia
The Fifth Family. The Ural-Altaic languages of northern Asia
The Sixth Family. The Dravidian languages of southern India
The Seventh Family. The Malay-Polynesian languages of the Pacific
The Eighth Family. The Bantu languages of Africa

Look at the map again and find where these languages are spoken.

Languages Spoken in North and South America

But what about the Indian languages and those of other nature peoples in the Americas? Of their beginnings the scientists know very little indeed. They know that everywhere over these vast continents are many tribes of nature peoples;



MAP 10. Many scientists believe that the first alphabet was invented by the Seirites, who lived on the Sinai peninsula. From there, as the lines and arrows show, it spread to Arabia and India. Later the use of an alphabet spread to every continent on the earth

that everywhere there are languages and dialects. But it is very difficult to trace back the history of those languages and dialects because they have been changed so much as the years have passed. For this reason, perhaps, scientists have not said that the languages of the nature peoples in the Western Hemisphere belong to new language families.

This, then, completes our study of races and languages and the origins of the new white peoples, the Indo-Europeans.

In the next three chapters we shall see how the Indo-Europeans carried the new civilization to southeastern Europe, greatly improved it, and spread all over that continent.

Books You Would Like To Read

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Clodd, Edward. Story of the Alphabet (new edition). D. Appleton-Century Company, Inc., New York.

Hayes, C. The Tongues of Man. Follett Publishing Company, Chicago.

Ilin, M. Black on White. J. B. Lippincott Company, Philadelphia.

Lipman, Michael. How Men Kept Their Records. Thomas Nelson & Sons, New York.

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Van Loon, H. W. Ancient Man. Boni & Liveright, New York.

CHAPTER XIV

Crete, the Third Great Civilization: A Steppingstone to Europe

Its Favorable Location in the Mediterranean Sea

LOOKING at map 7 on page 149 do you see any land lying between southern Europe and Egypt? Is there some which could have been a sort of steppingstone between Europe and Africa and Asia over which civilized ways of doing things could be carried? What about the island of Crete? Do you see it to the south of the Aegean Sea, which washes Europe on one side and Asia on the other? Is it not likely that here in this central place people might have developed a civilization like the two most ancient civilizations of the Mediterranean regions?

At any rate, that is what happened. In Crete, about 3000 B.C., people did develop the third great Mediterranean civilization. From Crete the better ways of living spread: fine houses, agriculture, pottery, weaving, arts of industry, transportation, and government. They traveled to the shores and islands of the Aegean until the whole region became a center of advanced ways of living.

We do not know how much of this Cretan civilization and that which spread all around the Aegean Sea was invented by the people of Crete. Nor do we know how much was the result of the influence of the older civilizations. Probably both things happened. Certain it is that Egypt, particularly, had a good deal of influence upon Crete. In making copper daggers, stone vases, and other objects the Cretans copied designs which had been used in Egypt. Ships traveled back and forth between the two lands, and the younger civilization learned many things because of its contact with the older. The older one, too, learned from the younger.

Its Special Geography

The Cretan civilization, however, was not an exact copy of the Egyptian or of any other civilization. It developed in its own way out of the Cretan New Stone Age. The conditions under which it developed were not like those of the earlier civilizations. You can see some of the differences by looking at the map. How do Crete and the Aegean region differ from Mesopotamia and Egypt?

For example, is this first center of European civilization in a fertile river valley? Not at all. It is made up of coastlands, not of fertile river valleys. It is not low and well-watered, but rocky and mountainous and dry. Indeed, none of the land is very good for farming. Only here and there can a spot be found on which grain and grapevines and olive trees can be raised. Because grains do not grow very successfully anywhere in this region, the amount raised will feed only a small population. From ancient times, however, large harvests of grapes and olives, from carefully tended vines and trees, have been gathered.

Cattle-raising too is successfully carried on in this region. Often it happens that soil too poor and dry for grain-raising can be planted with grass and made into fine pasture land. In this way Crete and the islands of the Aegean are like the grasslands of central and southern Asia where animals were perhaps first tamed and raised.

Therefore we can imagine the New Stone Age life of this region as somewhat different from that of Egypt and Mesopotamia. It centered less around grain-growing and more around olive and grapevine growing and cattle-raising. And as time went on, the geography of Crete proved to be very favorable for the growth of one special kind of life — more favorable here than in the other two famous river valleys of Egypt and Mesopotamia.

A Seafaring and Trading People

From your map you can see that Crete and the lands of the Aegean do not border on a river, but on the sea. Now the seashore does not tempt men to a farming life. It leads them to a seagoing life. You will notice how remarkably "indented" is the shore line of the countries bordering on the Aegean. An irregular shore line, of course, means inlets, bays, and harbors in which ships can lie at anchor. But why do men use ships and go to sea? For deep-sea fishing? Perhaps; but, even more, they go to trade with people in neighboring lands.

But now notice one other thing about the Aegean Sea. With Crete lying at the southern end, it is really like a large and almost closed lake. It is perhaps 200 miles wide and from 300 to 400 miles long. Hundreds of little islands are scattered all over it.

Not only did the people of this region have the sea close at hand and good harbors in which to anchor their ships, but, having put out to sea, land was never far off. So many islands dot the Aegean that rarely ever was the sea traveler out of sight of land. So he was tempted by easy steps to take longer and longer voyages to islands farther off. And having become used to traveling, he was finally able to extend his voyages clear across the Aegean and finally across the Mediterranean Sea itself.

Thus Crete and the countries along the Aegean became seagoing and trading lands. Everything about the life there

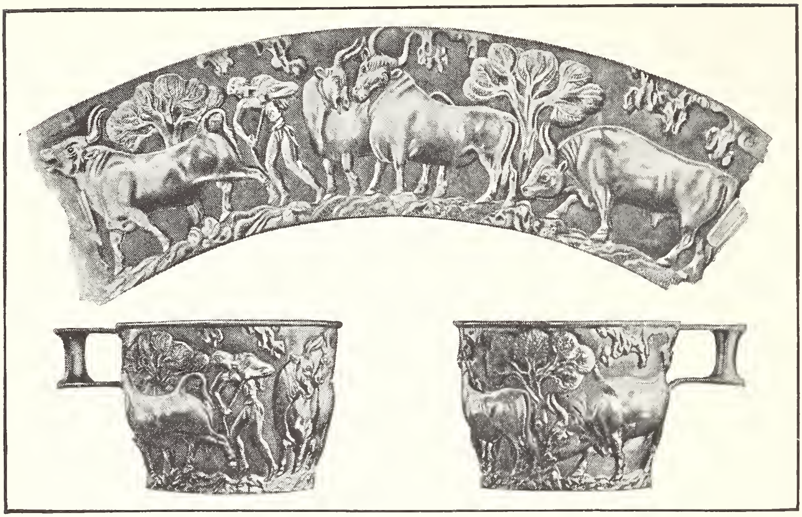

Fig. 85. This golden cup is an example of the beautiful work done by Cretan goldsmiths. It pictures the capture of a half-wild bull by trickery

shows that. For example, the people in the towns lived to a large extent by *trade.* The ships with high prows which the Cretans learned to build became the models for ships used by all Mediterranean peoples. Many of the roads stretching from the interior towns to the seaports were paved with stone and well kept up, so that goods for trading could be easily transported. We repeat: *the life of Crete centered around trade.*

Fine Industries and Crafts

And what did the high-prowed ships carry from the home ports of the Aegean to foreign lands and back home again? Grain had to be brought to feed the growing populations of Crete and the mainland bordering on the Aegean. In return for grain, these lands sent out fine wines and olive oil. And as their craftsmen grew more skillful they sent manufactured goods famous for their beauty — vases of marvelous color and design, fine work in gold and silver, skillfully carved copper and bronze weapons. There was nothing of iron; for the Cretan and Aegean civilizations never reached the Iron Age. They died before iron became widely used around the Near East.

Perhaps it was partly because of the need for keeping records of what they bought and sold that the Cretans developed their own way of writing. No one, as yet, has been able to decipher their alphabet. We hope that some day the scientists will be as able to read Cretan writing as they are to read that of the Egyptians and Babylonians. Then we shall know much more about this interesting civilization.

As time passed, the lands around the Aegean Sea were united under one king called "Minos," who lived at Cnossus in the main island of Crete. By that time, however, Crete was already a very advanced civilization — advanced in its architecture and engineering, advanced in its agriculture and industry and transportation, advanced in its arts.

Only a few years ago scientists dug up the magnificent, long-forgotten palace of Minos. They have learned much about Cretan civilization from its ruins. The palace was very large, with many corridors, courts, and rooms. The royal family and their servants and slaves were not the only ones who lived in it; it was the home of large numbers of men and women who made up the court circle. The palace had such conveniences as European royal families even 150 years ago did not possess. There was an excellent sewage system. The queen had her own bathroom. So advanced was their engineering that water was piped from springs into the palace.

The decorations of the palace are remarkable for their beauty. Huge pottery vases were placed here and there; probably no other people has made such fine ones. The walls of the rooms were very beautifully painted with flower designs and pictures of animals and people. One famous figure is known as "the cupbearer." The scientist who found it described it in this way:

> The colours were almost as brilliant as when they were laid down over three thousand years before. For the first time the true portraiture of a man of this mysterious . . . race rises before us. The flesh tint . . . is of a deep reddish-brown. The limbs are finely molded, though the waist . . . is tightly drawn by a silver-mounted girdle. . . . The profile of the face is pure. . . . The lips are somewhat full. . . . There was something very impressive in this vision of brilliant youth and of male beauty, recalled after so long an interval to our upper air from what had been (till yesterday) a forgotten world. Even our untutored Cretan workmen felt the spell and fascination.[1]

The Advanced Life of the Ruling Classes

The scenes of court life as shown on vases and in frescoes are interesting for the vivid way in which they bring back the long-forgotten past of Crete.

The dress of the men and women was very different from that of the Egyptians or the Mesopotamians. The men wore only a tight waistcloth, leaving the upper part of the body and the legs bare. This garment often included an elaborate girdle, sometimes of gold and silver, sometimes of richly colored embroideries. On their feet the men wore boots which reached to their calves. These were made, perhaps, of white or buff or red leather. This simple costume gave great freedom to the body and may have been partly responsible for their being so healthy, strong, and well-shaped.

The women wore a costume strangely modern. It looked very much like dresses of thirty or thirty-five years ago. The

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[1] A. J. Evans, *Monthly Review* (March, 1901), pp. 124–125.

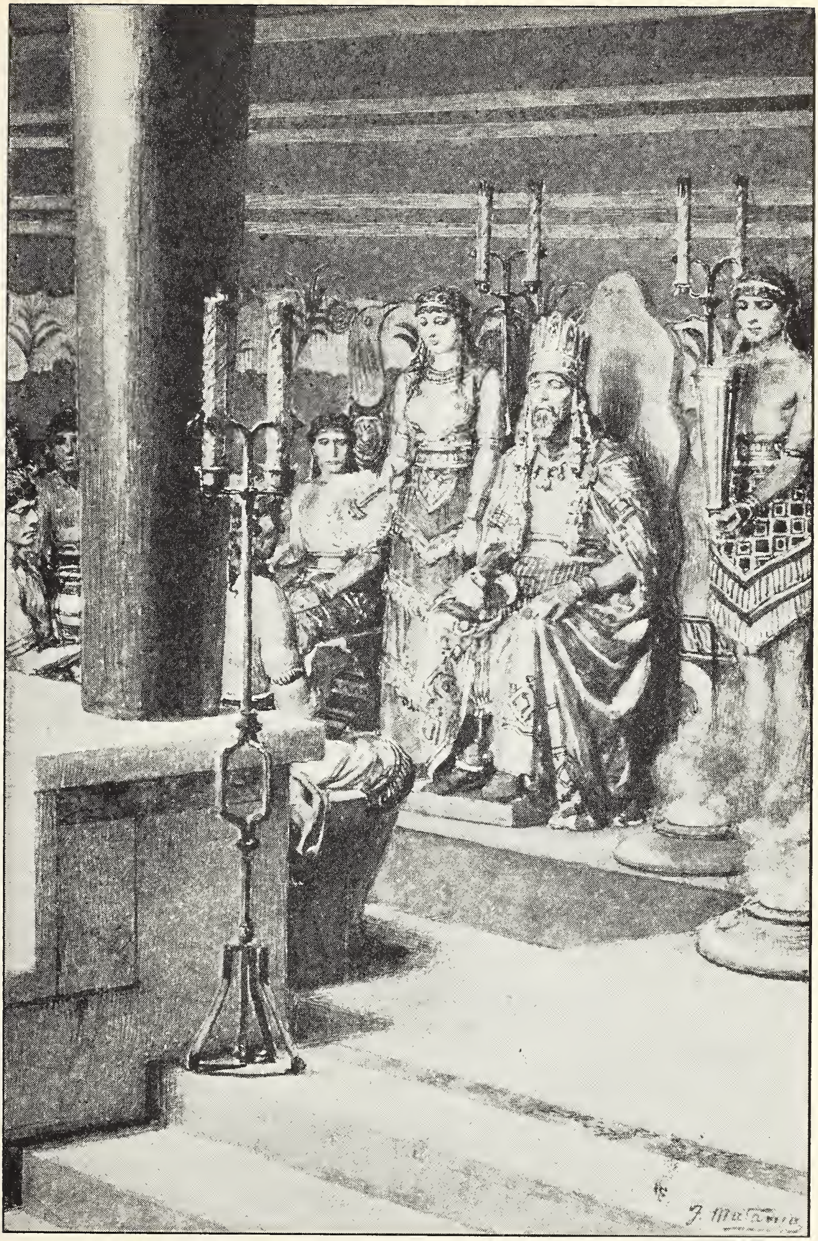


FIG. 86. The throne room in the palace at Cnossus as a modern artist has pictured it. What does it tell about Cretan civilization?

waist was drawn in very tight. The skirt was long and full, often with flounces or ruffles. Your grandmother will tell you that she once wore dresses much like that.

The life of these men and women, as shown in the painted scenes, was full of pleasant things. There was music and dancing. There were festivals and games. All the scenes have a certain gaiety.

But Most of the People Were Cruelly Treated as Slaves

But there was another side to the story of the palace of Minos, as there usually is another side to most pleasant stories. In one of the rooms there was a lovely fresco of a little boy picking crocuses. But under that room there were some deep cells. From Greek myths of a later day we get some idea of the way the people of the mainland lived in fear and terror of Minos. No doubt many a youth captured in war or on a raiding expedition was thrown into those cells. Or perhaps they were used for Cretans who displeased the great king. Or possibly servants or slaves of the palace who failed to obey his commands quickly enough were put there. Whatever these unpleasant holes were used for, they provide contrast enough to the gay life which went on above them. They remind us that Crete, like every one of the early civilizations, was a "slave" state. The ruling class — a few leisurely people — lived by the backbreaking work of the thousands of slaves.

The Sudden Destruction of Crete

But one tragic day about 1400 B.C. the glories of Cnossus came to a violent end. When the day began, it must have seemed like any other day. The workers at the palace went about their jobs as usual. We know that to be true; for when Cnossus was dug up over 3000 years later, the diggers found the work of stonemasons, vase-makers, and goldworkers unfinished, as if the workmen were all forced to leave instantly.

What happened? Was there a sudden appearance of ships in the harbors? Did armed men take the place by surprise, kill the people, rob the buildings of all the valuables they could carry away, and leave them burning? So it is thought. Of one thing we feel fairly sure — invaders did come and they were from the European shore of the Aegean Sea, from that land which was a little later called Greece.

The great days of Cretan and Aegean civilization really ended when Cnossus was destroyed. To be sure, for years and years to come, vases were still made there, frescoes were still painted, metal was still worked into tools and ornaments. And, indeed, the work was still beautiful. But, somehow, the spirit had gone out of everything. The quality of the work declined. The first great European civilization was near its death.

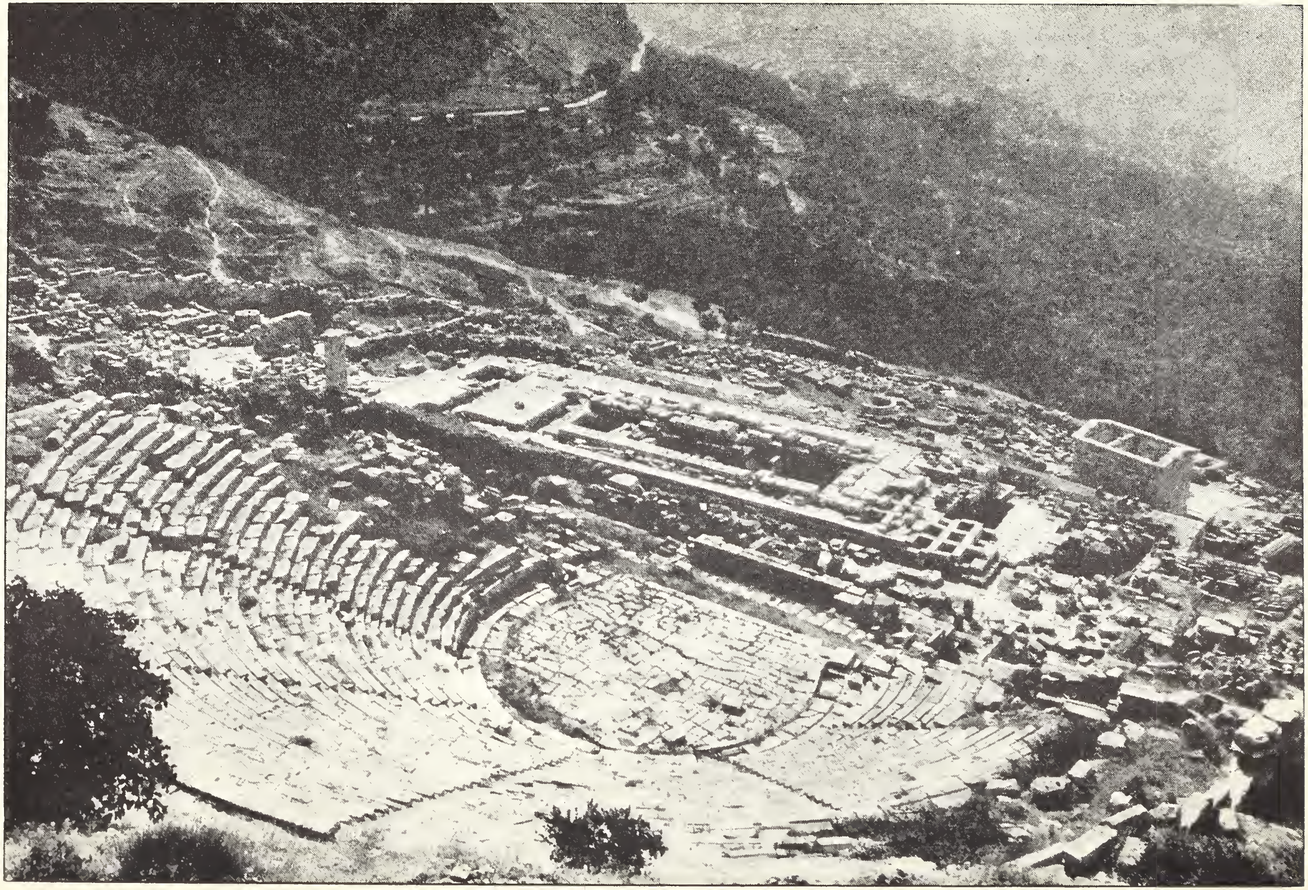
Books You Would Like To Read

Berry, Erick. The Winged Girl of Knossos. D. Appleton-Century, Inc., New York.

Bridges, T. C. The Young Folks' Book of the Sea. Little, Brown & Company, Boston.

Clowes, G. S. L., and Trew, Cecil. The Story of Sail. Henry Holt and Company, Inc., New York.

Hall, Jennie. Buried Cities. The Macmillan Company, New York.



Ewing Galloway

FIG. 87. The ruins of the theater and temple of Apollo at Delphi, on the southern slope of Mount Parnassus

CHAPTER XV

Greece: The Second Civilization of Europe

The Beginnings of Greek Civilization

How did the fall of Cnossus come about? Who were the armed men who attacked the city and destroyed the Cretan and Aegean civilization?

They were tribes of barbarians who had fought their way from the north and west over the mainland of what is now Greece. Between 1400 and 1000 B.C. these Asiatic white peoples, now called Indo-Europeans, traveled on to the other Aegean lands, conquering the peoples wherever they went. It was they who wiped out Crete, the first European civilization. It was they who built the second and greater civilization, that of Greece.

Historians think that these invasions started about the year 2000 B.C. Just where they began, we do not know; but before that time the tribes were living somewhere on the plains of eastern Europe or in the highlands of central Asia. Whether they came from the land of the Hittites or elsewhere in Asia Minor, or whether they came from the land farther to the north, is not known. At any rate, something had set them moving from their original home east of the Caspian Sea, and they spread in all directions. Some settled in central Asia; others went southward across the Himalayas and joined their cousins in India. Still others traveled northward and westward into Europe until they took possession of a large part of the continent. These became the ancestors of most Europeans and Americans of today.

For centuries following these invasions life around the Aegean was dark indeed. Between about 1300 and 1000 B.C. one expedition after another attacked the people in the islands, destroying almost everything in their civilization.

This period from 2000 to 1000 B.C. was the Copper and Bronze Age of these Aegean peoples. The shields and spears, swords and daggers, of the well-to-do — the "nobles," who spent much of their time fighting — were made of bronze. Tool-makers and weapon-makers had become very skillful in making things out of metal. They had learned well the lessons which the river-valley peoples of the Near East had taught them.

It was a period of wars and heroes, this ancient time from 2000 to 1000 B.C. Because these tribesmen could not write we have no clear records of what they did and said. But we know that they were singers of songs about the brave deeds of their warriors. In fact, some among them became "bards," who sang songs for their living. They played the harp and recited poems to its music.

One of these ancient Greek singers you can easily remember. That was Homer, who is said to be the author of the two famous books the Iliad and the Odyssey. The Iliad tells the story of the Trojan War, which, it is thought, took place between 1197 B.C. and 1187 B.C. The Odyssey is the story of the travels and experiences of the Greek hero Odysseus, after the capture and destruction of Troy. Actually these great books of the ancient Greeks were probably not written until about 800 or 700 B.C. It is likely too that they are the work of many different bards, and that Homer first brought the stories together.

In the years after 2000 B.C. the rough Indo-Europeans gradually settled on the land of the Balkan Peninsula. They began to see almost at once that there were peoples in the world who knew things which they themselves did not know and who could do things which they were unable to do. Across the Mediterranean, for example, were the Phoenicians, the important traders of the day. They began to bring to these barbarians all kinds of goods, such as cloth, vases, and ornaments, from the more civilized lands of Asia and Africa. Thus their contacts with the peoples of Greece as well as the Phoenicians brought new ideas and new ways of living to the Indo-Europeans.

Perhaps the most important thing which the Phoenicians brought to these peoples was the alphabet. As you know, the Phoenician alphabet had grown out of the writing of older civilizations. The Phoenician merchants made out their bills in this alphabet, and slowly the ancient Greeks began to learn it. By the 700's B.C. the Greeks were using the Phoenician alphabet for their own writing.

What kind of land was this Greece, and what kind of civilization grew up there? Was it like the Aegean civilization, which had gone just before it? Was it like the ancient Babylonian and Egyptian civilizations? Was it like the Phoenician civilization of that time?

No, it was not like any one of these, and yet it sprang from all of them. As you know, the Greeks learned some things through trade with the Phoenicians. As they themselves traded and traveled they learned from their other neighbors of Asia and Africa. As time went on, they used this knowledge in building a civilization which was all their own.

The Geography of the Land

A Mountain Peninsula

The land in which Greek civilization grew was mountainous and rocky. If you study the map of southern Europe, you will find three peninsulas (see map following page 473). One is the Balkan Peninsula, which has been named from the Balkan

Mountains. The second is Italy. The third is Spain. All three are really mountain peninsulas.

Look at the Balkan Peninsula more closely on map 12, page 269. Notice that Greece is like a hand stretching its fingers into the Mediterranean Sea toward Crete. The bony ridges stand out as the mountain ranges. The Dinaric Alps — the wrist — rise 4000 to 6000 feet high and run along the Adriatic coast. The Balkans, 2000 to 3000 feet high, only partly shut off the peninsula from the north. The Pindus Mountains, 2000 to 3000 feet high, and especially the Rhodope Mountains, reaching to 9000 feet, are the bones of the hand itself. On the western shore of the Gulf of Salonika the beautiful snow-capped Olympus reaches almost 10,000 feet toward the sky. It is little wonder that the very early Greek tribes regarded Olympus as the home of their gods!

The Climate

The northern part of the mountainous Balkan Peninsula lies at 45° north latitude. As we should expect, the cold winds (map 11) blowing from the west Russian steppes across the low Balkan Mountains makes the part which is today Bulgaria and Yugoslavia cold and snowy in winter. In summer, however, the climate is mild and temperate.

The high Rhodope range prevents the cold winter winds from blowing across the peninsula, and so the lower part, which is Greece, — lying about 37° to 41° north latitude, — is mild even in that season. In summer, however, it is hot.

The winds from the warm Mediterranean and Ionian seas bring enough rainfall (20 to 40 inches a year) for the raising of olives, grapes, lemons, oranges, figs, and mulberries. For no one knows how long the tribesmen who settled in this peninsula engaged in that kind of farming. Naturally in the mountain valleys cereal-raising was more difficult.

An Irregular Coast Line

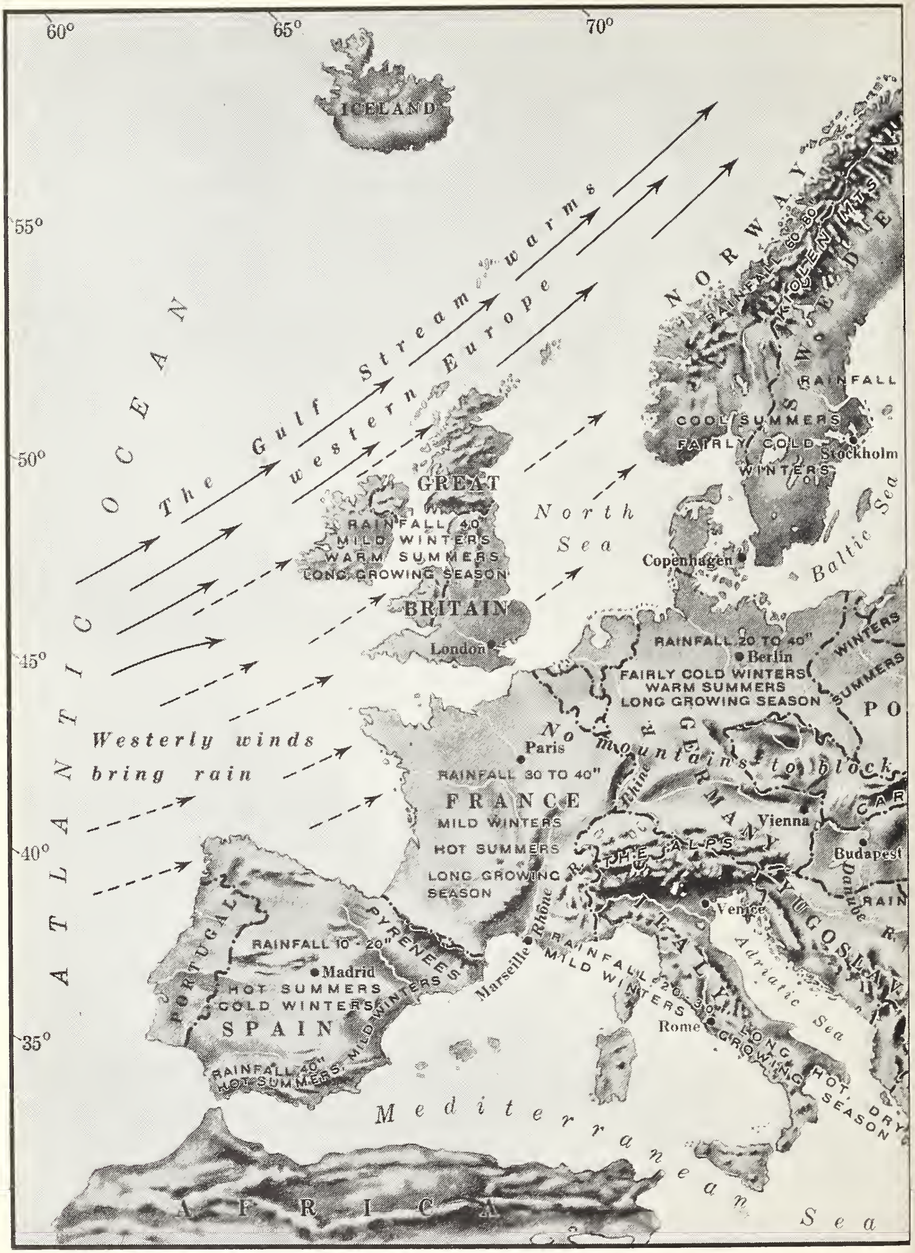
Not only did the mountains and valleys of Greece help to decide what ways of living were to grow up there; the remarkable coast line was important as well. Remember that this land was part of the "Aegean world." The Aegean Sea bounded its eastern coast, and the Ionian Sea its western coast. Hundreds, yes, thousands of islands dotted these seas. Hundreds, yes, thousands of inlets and bays indented its coasts.

What does an indented coast mean? Harbors. Safe places for ships to anchor. Places where port communities can grow up. Such a region is almost sure to be a center of trade. And where there are centers of trade, rich towns and cities are built. Sooner or later the people develop architecture and landscaping, sculpture and painting, music and the theater. It has always been thus throughout the history of civilization. So it was in Greece. The Balkan Peninsula was an excellent place for a people to build their civilization.

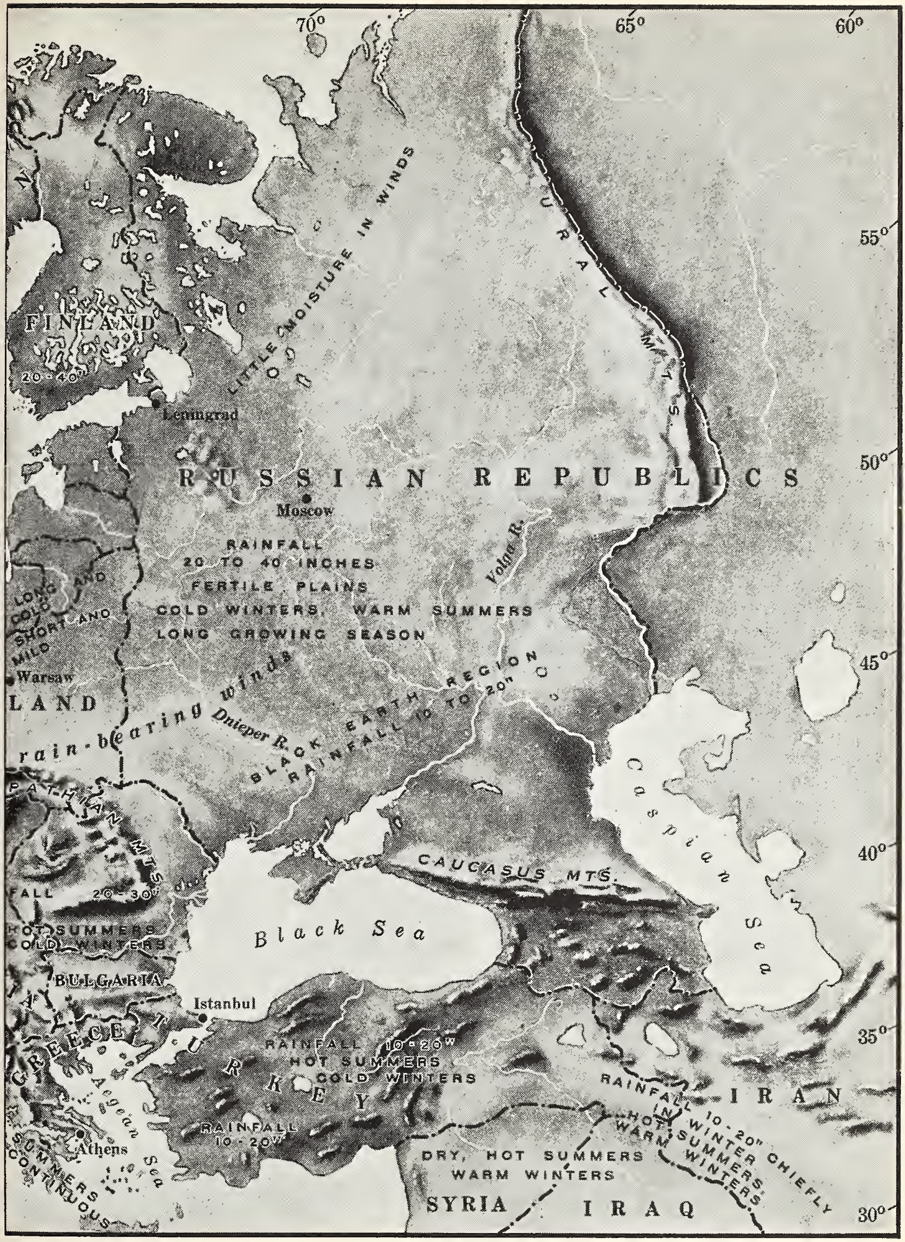
Greek Civilization Grew as City-States

In the southern end of this mountainous and indented Balkan Peninsula some of the white Indo-European tribes settled down and began new ways of living. Villages and towns sprang up. Each village or town with its surrounding farms was cut off by hills and mountains from the rest of the world. Within each valley a tribe lived in its own way. Except in time of war it had little to do with the people of other communities of the peninsula that came to be called Greece.

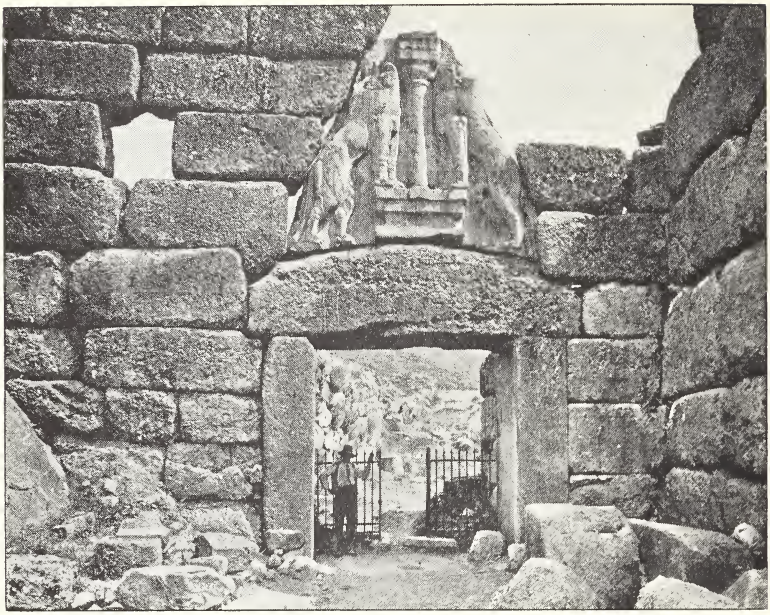
Greece was never a unified country like those which grew up in the river-valley plains. From its mountain-valley geography you can see why the history of Greece was different from that of Egypt and Mesopotamia. It was never united under



Map 11. This map shows that there are many kinds of climate in Europe.



In most places the climate is mild and there is rain enough for crops



© Metropolitan Museum

Fig. 88. A gateway to the ancient city-state of Mycenae in southern Greece. It is called the Lions' Gate because of the two lions sculptured above it

one ruler. The little parts — the city-states — were separated; they could not be held together. Each city had its own history and its own civilization quite different from that of the others.

In the period from about 700 B.C. to 400 B.C. there were more than 100 of these little city-states in Greece. From them settlers went eastward across the Aegean Sea to the shore of Asia, or westward to southern Italy and Sicily, and there made new settlements. There came a time when there were more than 1000 Greek city-states scattered around the Mediterranean Sea!

Of these thousand, which shall we select to show the kind of civilization that the Greeks developed? There were a number of important cities; for example, Sparta, Thebes, Corinth, and Athens. All were different; all were interesting. But most students think that Athens stands out as the one which reached the highest point of civilization and which therefore gave most to the peoples of the future. Some people claim that no civilization since has risen so high. There seems reason enough, then, to look more closely at the life of Athens.

Athens: The Greatest of the Greek City-States

The Ancient "Acropolis" — the "Highest City"

Where was Athens built? Let us look now to the southern part of the peninsula of Greece (map 12). There you will find a long narrow plain between two ranges of hills. Although this whole southern section of Greece had little land that could be farmed, this plain was carefully cultivated by farmers. It must have seemed a green and refreshing spot to anyone who came upon it after a long trip through the mountains.

High above the plain, not far from the seacoast, was the Acropolis, a hill of rock with steep sides. It was here that the town of Athens was built. In the early days the hill was used as a kind of fort to which the people went for protection when they were attacked. The farmers looked toward Athens as the center of their community. Later this hill became the very heart of the city where were built the temples in which the gods were supposed to live. It was called the Acropolis, a name made from two Greek words: *akros* meaning "highest" and *polis* meaning "city." Put together, they meant the "highest city." There were many such acropolises in ancient Greece. Every community was built on or near one as protection against invading enemies. When you study the history of Europe, you will see that the castles of nobles, like these cities of ancient Greece, were built on hills, cliffs, or other high places which could easily be defended.

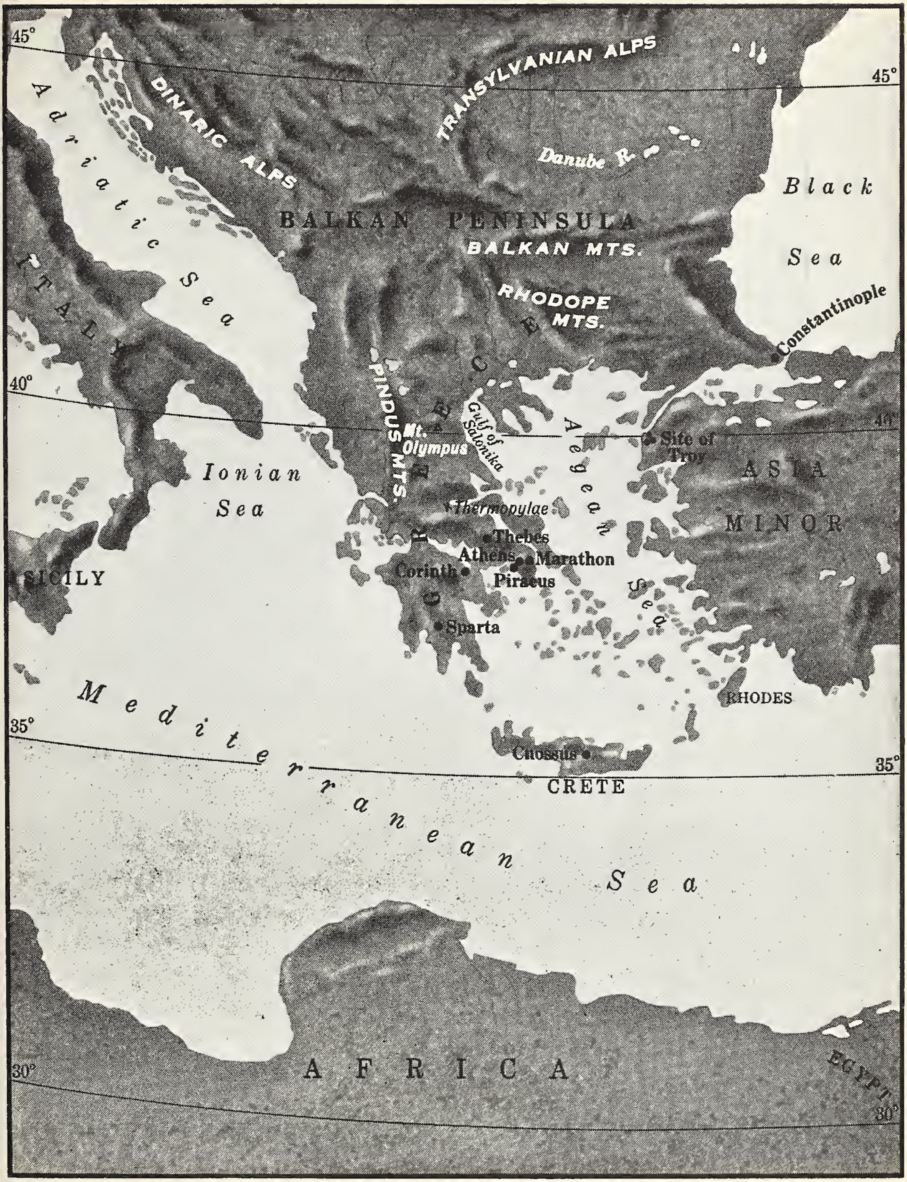
In this book we cannot tell the long story of invasions and almost continuous warfare that went on from about 500 to 480 B.C. between the Persians and other people of the Iran-Asia Minor plateau and the Greeks. All we can say is that two of the most important of these invasions from the East came in 490 B.C. and 480 B.C. In 490 B.C. the Athenians defeated the Persians at the famous battle of Marathon, killing 6000 Persians and losing only 200 of their own men. Ten years later the Persians advanced again both on land and on sea. In the Bay of Salamis their huge fleet of ships was scattered and defeated by the Greek fleet. At Thermopylae one of the world's famous battles was fought. (The name comes from some hot springs that are located there. The Greek word *thermos* means "hot." Do you see that our word *thermos* comes from the Greek? Also our word *thermometer*?) Thermopylae was a narrow path only about 50 feet wide between a tall, rocky cliff and the sea. Here it was that the Spartan leader Leonidas and 300 men died in an attempt to keep the Persian army of King Xerxes from marching down on Athens.

As a result of all these wars Athens was little more than a mass of ruins by 479 B.C.

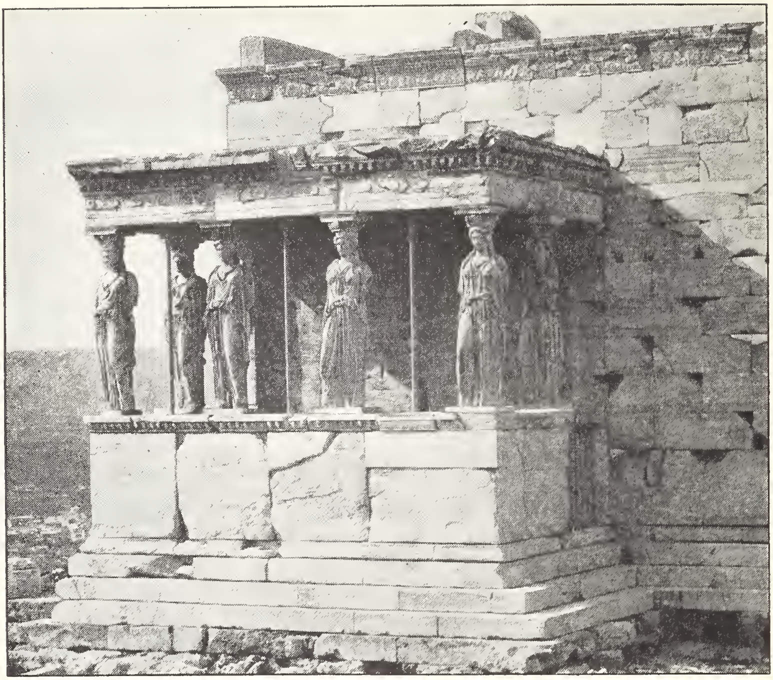
In the 400's B.C. Came the Height of Greece's Glory

After the battle of Thermopylae there followed one of the most wonderful periods in all history. Indeed, during this period Athens reached the highest point of her civilization. It was one of those wonderful centuries when everything seemed to happen at once, like the ten centuries of pyramid-building between 3000 B.C. and 2000 B.C. in Egypt.

By 429 B.C. Athens was a city of stone and marble buildings. The Acropolis was covered with temples to the gods. The



Map 12. Greece



Ewing Galloway

Fig. 89. On the corner of the Erechtheum, built in 407 B.C., is this example of beautiful Greek sculpture

finest of these was the Parthenon,[1] the home of Athene, the goddess who was supposed to be the special protectress of Athens. Even today the ruins of the Parthenon are beautiful, and what the building was when it was new you can imagine from figure 90. Like most Greek public buildings, it was decorated with columns, two rows of them with a passageway between. Above the inner row of columns, an artist or artists

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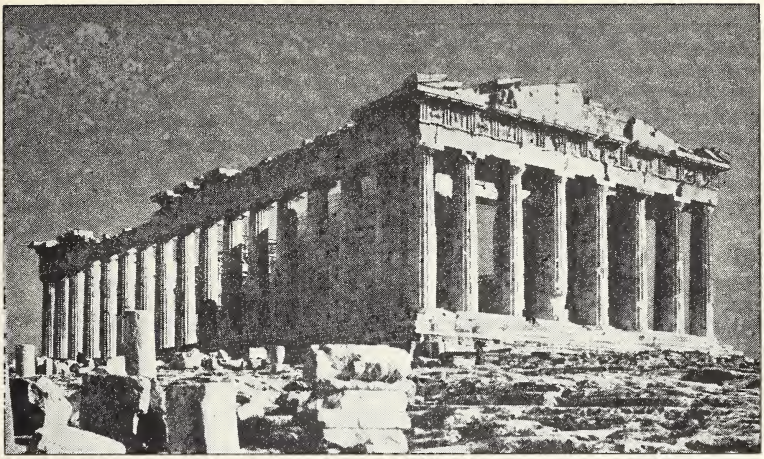
[1] No doubt you will wish to read again the story of the building of the Parthenon and of the development of the Greek theater, poetry, and music in *Man at Work: His Arts and Crafts.*



Ewing Galloway

FIG. 90. The Parthenon at Athens, dedicated to the goddess Athene, shows to what heights Greek architecture had developed

carved a procession in honor of Athene. This ran entirely around the building. It is considered one of the great works of art of all ages.

Everywhere there were statues and wall carvings made by famous sculptors. (Figure 89 is an example of Greek sculpture.) Perhaps no other people has been able to make as beautiful things as those the Athenian artists made. There are only a few modern sculptors who can compare with those of Athens in the days of its glory.

The Houses and Furnishings of Most of the People

Not all of Athens was beautiful, of course. The streets on which most of the people lived were narrow and dark and dirty. The waste and garbage were thrown out into them by the people who lived on them. We are not surprised to learn, therefore, that toward the end of this century a plague visited the city, killing large numbers of people, rich and poor alike.

The houses, even those of the fairly well-to-do, were of sun-baked brick and one-story high, with rooms built around an open court. Hard, tramped earth provided the floor. Since the weather was mild and clear so much of the year, the Greek family lived in this out-of-door court much of the time.

The Greek houses had few conveniences. There were no stoves or chimneys, only pans of burning charcoal on the floor for heat. An olive-oil lamp provided the light. "About like our frontier homes," you say. Not quite; for the furnishings of the Greek houses were remarkable. The Greeks had developed their crafts to a high degree. By 600 B.C. Athens particularly had become a manufacturing center. All kinds of trades were carried on. There were coppersmiths and goldsmiths, carpenters, wagon-makers, rope-makers, flax-workers, leather-cutters, knife-makers, boot-makers, flute-makers, sail-makers, drug-makers, and numerous other kinds of craftsmen. Each trade had many kinds of workers. In all of these arts and crafts the workers showed marvelous skill.

Is it any wonder, then, that Athens began to trade with the rest of the world that she knew? There were many products to exchange for the grain her people needed so very much.

Athens: A Center of World Trade in the 400's B.C.

Around the city on the hill was a great wall from which ran two walls a little distance apart. These smaller walls bordered a roadway down to the harbor town of Piraeus. Piraeus was the port of Athens, from which the ships came and went. It was a busy place, with people coming and going, buying and selling, and arranging for voyages. By the 400's B.C. Athens was a large trading center, with warehouses filled with goods.

In the ships which sailed away, there were carried all kinds of goods manufactured in the city. And in the ships which came back there were many products of other lands around the Mediterranean Sea. Most important of these was wheat to feed the hungry thousands of Athenians, for the farms around the city supplied only a small part of the food which was needed.

But ships for trade were not the only ones to leave the port of Piraeus. Athens had gained control of many cities around the Aegean, and in order to protect and keep this empire, she had to send out expeditions for war. Very often soldiers could be seen leaving the town in warships.

The Two Things That Greeks Gave Civilization

So far there is much about Athens to remind us of the older civilizations we have studied. Beautiful buildings and fine sculpture were not new. Those of this Greek city were different from those of Egypt and Babylonia, to be sure, but if we study them carefully we can see how the Greeks had learned from the earlier peoples. The idea of the Athenians that beautiful things were worth making and having had also been part of Egyptian and Chinese thinking.

Nor was there anything so very new about the manufacturing and trade of Athens. Egypt and Babylonia from ancient times had carried on trade. The old Cretans and Aegeans and the later Phoenicians had sailed far and wide on the Mediterranean.

But there were two things about Athenian civilization in the 400's B.C. which stand out as the beginning of something different. In these ways we find the Athenians far more advanced than were the Babylonians and Egyptians and the other peoples who had lived before this time.

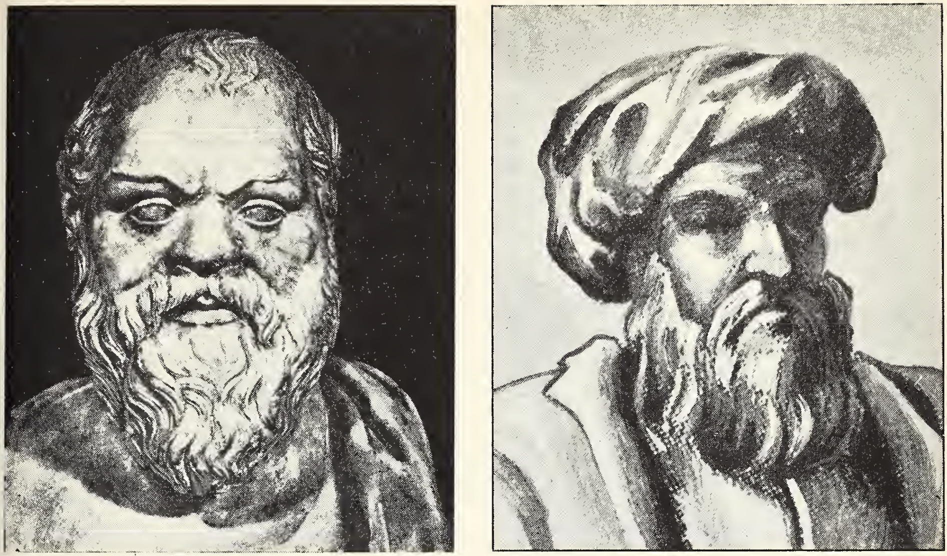
First, the Athenian Greeks Were Good Thinkers!

In the first place, the Athenians introduced new ideas into the world. Now the peoples of the more ancient lands had wondered about the earth, how it came to be, and why men are as they are. But in order to solve these problems, they had invented "gods" who, they believed, had made the world and the men in it. In legends or myths they told their children about these things and about the ways the gods helped and punished men. Thus, you see, all of life was explained by what we call the "supernatural"; that is, by something beyond the natural, something mere men could not understand.

The Thinking Greeks Began To Question

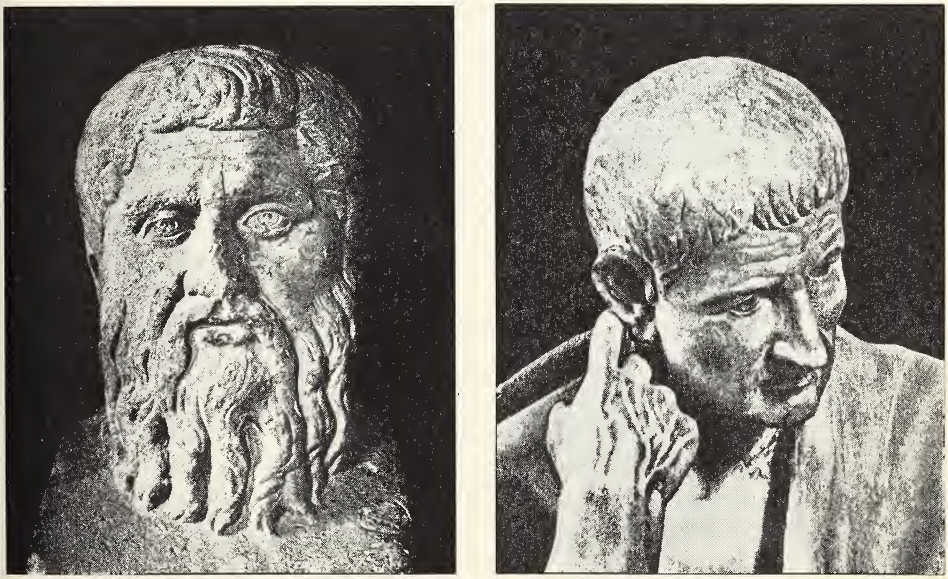
The very ancient Greeks, too, had had their gods and their myths explaining the world. In the early days — 2000 B.C. . . . 1500 B.C. . . . 1000 B.C. . . . and even later — they believed in these gods just as the Egyptians and Babylonians had in theirs. But by the 400's B.C. many Athenians began to look at the mysteries of the world and of the life of men in a new way. They did not entirely forget about their gods, but a group of intelligent men began to question things. They began to say: "Why should we believe that the gods made things in these ways just because our fathers told us they did? Why should we not use our own minds to find out more about the world and men?"

And so these Athenians began to think about how the world came to be as it is, what is right and what is wrong, what is true and what is false. They thought about how people should treat each other, how governments should be formed — in fact, about many of the problems which trouble men's minds today. And they said: "We shall not take the word of a god or a man on these questions. We will think about them ourselves."



Socrates, a philosopher (469–399 B.C.)

Euclid, a mathematician (third century B.C.)



Ewing Galloway

Plato, a philosopher (427–347 B.C.)

Aristotle, a philosopher (384–322 B.C.)

FIG. 91. These Greek thinkers of more than 2000 years ago gave to the world ideas which were to help thinking for thousands of years to come

Poets Created the Drama and the Theater

And so the life of art and thought developed in Athens. Poets began to write plays and marvelous pageants which were performed in outdoor theaters. Aeschylus (525–456 B.C.), the "Father of Greek Drama," Sophocles, the greatest of all the poet-drama writers (495–405 B.C.), and Euripides (480–406 B.C.) were the most important. Tens of thousands of Athenians flocked to the theater of Dionysus to see the plays which had been written by these artists of the theater, music, and the dance. In these plays the problems of men's and women's lives were presented. After seeing and hearing them large numbers of the Athenian people began to think about these problems too.

Greek Philosophers (Thinkers): Socrates, Plato, Aristotle

Not through plays, but by other kinds of writing, the philosophers, or thinkers, pondered upon the problems of the earth and man. There was Socrates, who sat in the market place and asked people questions about man and how he should live. After discussing and teaching for many years, Socrates (469–399 B.C.) was put to death by the Athenian court for "not believing in the gods of the country" and for "corrupting the young."

Then there was Plato (427–347 B.C.), the pupil and follower of Socrates, who wrote down the thoughts of his master as well as his own thoughts on the problems of mankind.

And there was Aristotle (384–322 B.C.), who gathered together all that was known about the ways of nature, about plants and animals and the human body. He too was a philosopher, but he was also what we call a scientist.

Herodotus and Thucydides, the First Historians

Along with the writers of plays and the philosophers and the scientists, there were historians, who tried to learn of the past and who kept records of events. Among these are Heròdotus and Thucydides, whose works are used even today by the students of history. These old historians were not always accurate, of course; they were less exact about their records than modern historians are. But they saw the importance of finding out about the history of their own and other nations, and of recording it.

Do you see what a wonderful 200 years was this period from about 500 B.C. to about 300 B.C.? And what an advanced civilization the Greeks had built up at Athens by that time?

Dramatists, philosophers, scientists, historians — all examining the world and man, thinking about these questions, and trying to solve these problems. These men laid the foundations of thought for thousands of years to come.

Second, the Rise of Democratic Government in Athens

The other thing which the Athenians did that showed they were more advanced than earlier peoples was to build up a new kind of government. Government itself, of course, was not new. There were governments in Egypt, in Mesopotamia, in Crete. The tribes of Iran and the other Indo-Europeans had governments. It is probably true that every tribe in the latter centuries of the New Stone Age had some kind of government.

Among all these peoples, however, government consisted of one man or a very few men ruling over all the others.

Government of Athens and of other Greek city-states in the 400's B.C. was called "democracy." We have learned that democracy is hard to explain because the meaning of democracy changes from one age to another. But in general it means that the people themselves run their government; they govern themselves. Do you see how different this idea is from the one-man kind of government?

Let us look more closely at the way Athenian government was carried on, and we shall understand better what is meant by a democracy. It is important to remember, first, that only free men could vote and hold office. There were two groups to which all voters belonged. One was the court, before which men were tried when they broke the laws. The other was the assembly. There was a third group called the council, which was composed of 500 citizens who were chosen by lot from the body of Athenian voters. The council decided what laws should be proposed to the assembly. The assembly met at various times to accept a proposed law, replace it by another, change it, or refuse to pass it.

You can see, therefore, that the citizens of Athens did have a share in the making of the laws which governed them. They also took part in carrying out the laws, for they elected officers every year to govern the city. The most important of these officers were ten generals who managed the affairs of the city in time of peace just as they did in time of war.

It is not necessary for you to remember just how Athenian government was carried on. What is important is to see that the free citizens actually took part in their own government.

Most of the People Had No Power in the Government

But if a democracy is a government in which all the people take part, Athens was not really democratic. This is true. In the Athens of the 400's B.C. the government was really far from being a complete democracy. In the first place, the voting citizens made up only a small part of the whole population.

Most of the people were slaves, the property of masters. The masters had complete power over them, even to life and death. The slaves worked the farms, labored at making the goods for which Athens was famous, and did the work in the households.

There was another group of residents of Athens who had no share in the government. These were the foreigners who came from far-off lands because they were interested in the life of Athens. They might engage in business or trade, but were allowed no part in the government of the city.

Finally there were the women, who made up half of the population. Athenian women were, perhaps, a little more important than slaves, but not much. They were expected to stay within the walls of their homes, managing the work of the slaves. For most of the centuries we are studying they had little chance for education.

There were dangers in Athenian democracy, just as there are in all kinds of government. The middle 400's B.C. are an example. That period was called the Age of Pericles. Now Pericles was only one of the generals of Athens; but for years he had the Athenian government almost completely in his own hands. He it was who built the magnificent buildings which you have already heard about. He it was who practically made the laws for Athens. He did not take from the citizens their right to vote, but by his speeches in the council and assembly he was able to do pretty much as he pleased. He was a very wise and able man, but his power was too great to permit other people to have very much to say. His was really a one-man government.

Nevertheless the Athenians had made the beginnings of democracy. And the idea of democracy, which the Greeks introduced, was to lead to things of which the Greeks never dreamed.

Thus Greece, the Second " Steppingstone," Changed Civilization

And so, for a moment, we have seen this country of little city-states bloom into a wonderful civilization. It was a tiny spot on the map, but, as we shall see, its place in the history of civilization is very important.

Let us sum up briefly what the Greeks did to achieve one of the great civilizations of the earth :

They learned of and improved upon many things that the Egyptians and the Mesopotamians, the Phoenicians and the Indo-Europeans from Iran and Asia Minor, had invented.

Their busy merchant ships helped greatly to spread these things around the Mediterranean world.

More important still, they added a tremendous number of new things to civilization :

A new and better language.
New and better ways of thinking.
Great books, famous to this day.
An architecture that has become world-renowned.
Drama, literature, and poetry. Plays which are acted around the world today, 2500 years later.
The beginnings of a new science and mathematics upon which our engineering of today were to stand.
A kind of democracy for free men. One-man government was being dropped, and the Greeks were taking a step toward "government of the people, by the people, for the people."

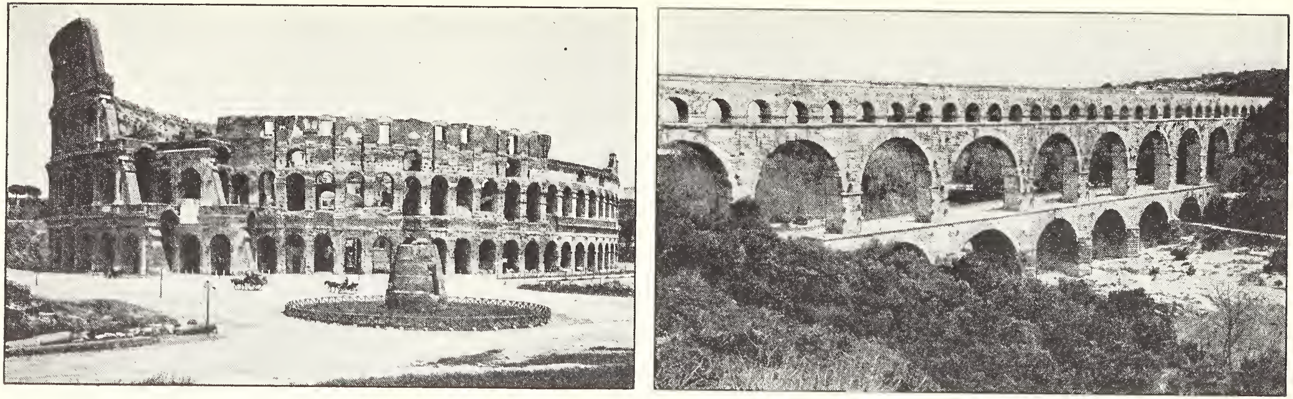
The best of all these things were done between the years 500 B.C. and 400 B.C. By 400 B.C. Greece's great work was finished. Her ships still carried the goods of the Mediterranean. Her schools and theaters still flourished. People still went about their affairs in 1000 city-states during the 300's . . .

200's . . . 100's B.C. But few great thinkers, few great writers, few great governors, were born to carry on the advance of civilization in Greece.

But in the peninsula to the west a third great stepping-stone was being made ready to spread the new civilization.

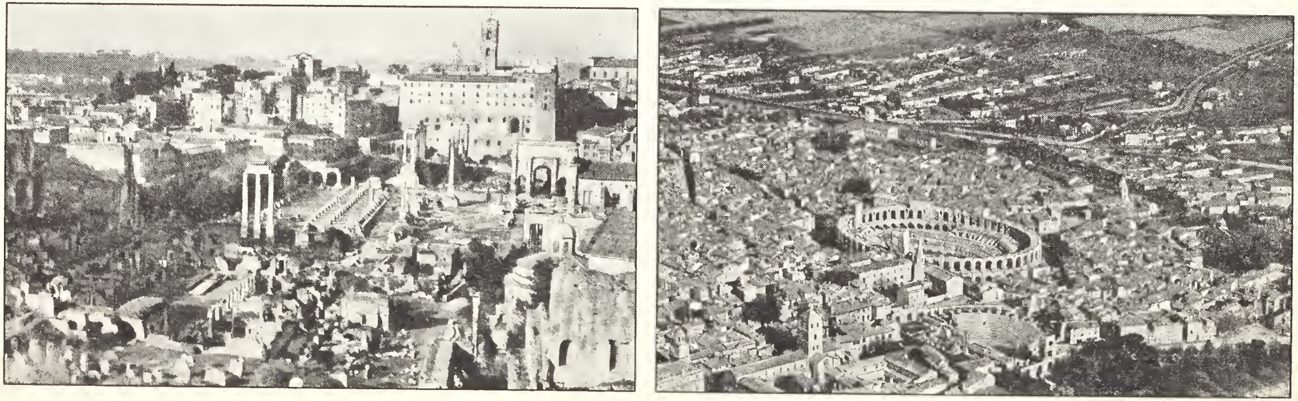
Books You Would Like To Read

BALDWIN, JAMES. Old Greek Stories. American Book Co., New York.
BEST, SUSIE M. Glorious Greece and Imperial Rome. The Macmillan Company, New York.
BROWNE, E. A. Greece. The Macmillan Company, New York.
CHIDSEY, ALAN LAKE. Odysseus, Sage of Greece. Minton, Balch & Co., New York.
COLUM, PADRAIC. The Children's Homer. The Macmillan Company, New York.
HAAREN, J. H., and POLAND, A. B. Famous Men of Greece. American Book Co., New York.
HALL, JENNIE. Four Old Greeks. Rand McNally & Company, Chicago.
HALL, JENNIE. Men of Old Greece. Little, Brown & Company, Boston.
LAMPREY, LOUISE. Children of Ancient Greece. Little, Brown & Company, Boston.
LANG, ANDREW. Tales of Troy and Greece. Longmans, Green & Co., New York.
MACGREGOR, MARY. Story of Greece. Frederick A. Stokes Company, New York.
PEABODY, J. P. Old Greek Folk Stories Told Anew. Houghton Mifflin Company, Boston.
SCALES, MRS. L. W. Boys of the Ages. Ginn and Company, Boston.
SNEDEKER, CAROLINE DALE. The Perilous Seat — The Story of a Girl of Delphi. Doubleday, Doran & Company, Inc., New York.
SNEDEKER, CAROLINE DALE. Theras and His Town. Doubleday, Doran & and Company, Inc., New York.
TAPPAN, E. M. Story of the Greek People. Houghton Mifflin Company, Boston.



The Colosseum at Rome

Roman aqueduct near Nîmes, France



The Roman Forum

Ewing Galloway

The Roman Colosseum at Arles, France

FIG. 92. Not only in their capital city but throughout their empire the Romans made use of their ideas of architecture

CHAPTER XVI

The Roman Empire Spread Civilization over Europe

During the very years that Athens was at the height of its glory, a little town was growing up on the peninsula which is now Italy. That little town was Rome, located on a number of hills by the side of the river Tiber. At first it was an unimportant little town. The people were rough-and-ready farmers and stock-raisers. The market place was like the market place of any country town, a spot where farm products and handmade goods were exchanged by the people.

But Rome was not to remain a little town. It was to become a great city. And around it was to grow an empire which would spread civilization over all of western Europe for many years to come. Let us see what happened to bring this about.

The Geography of the Mediterranean Region Favored Rome

Rome had many advantages to help it to become great. In the first place, it grew up almost in the center of a long boot-shaped peninsula which extended far out into the Mediterranean Sea (see map following page 473).

As you know, the Mediterranean was the center of the trade of the known world of northern Africa and southern Europe. It is unlikely that the people living around it knew much about what was happening in China and other parts of eastern Asia. To them the two words *medi*, meaning "middle," and *terra*, meaning "earth," did name the sea well — "Mediterranean."

Around the Mediterranean lived the peoples who had passed through the Stone Age and were living in civilized ways. In Asia Minor were the Indo-Europeans; on the east coast of the Mediterranean were the Phoenicians and their descendants. The Carthaginians lived in the north of Africa and in southern Spain, and the great Greek-Aegean center was on the northeast. And in this very "middle of the earth" grew Rome.

The peninsula itself was formed by the range of mountains called the Apennines, a range that in earlier times may have extended across to Sicily and joined the African mainland. In spite of the mountains, however, there were broad, fairly level places that could be used for farming and grazing. The climate was much like that of Greece and other Mediterranean lands — hot and dry in summer, mild and rainy in winter. From 20 to 30 inches of rainfall fell during each year. However, many days of sunshine made it possible for the Italic tribes in central Italy and the Etruscans in the north to raise many kinds of foods. Wheat and other cereals could be grown even in winter; olives, figs, grapes, and other fruits in the long, hot summer. Here was grown a great variety of farm products, both for sale and for home use.

In addition the peninsula had metals and minerals. There were deposits of gold and copper and iron which the people mined. There were marble quarries too. The mines and quarries of that time were not as large as they are today; but for those days, when ways of mining were crude, they were considered quite large.

It seems to us, looking back, that the geography of the region made sure that Rome would be a great trading center, and that is what it became. Gradually the Roman armies conquered the other peoples of the peninsula, and soon her trade and power grew.

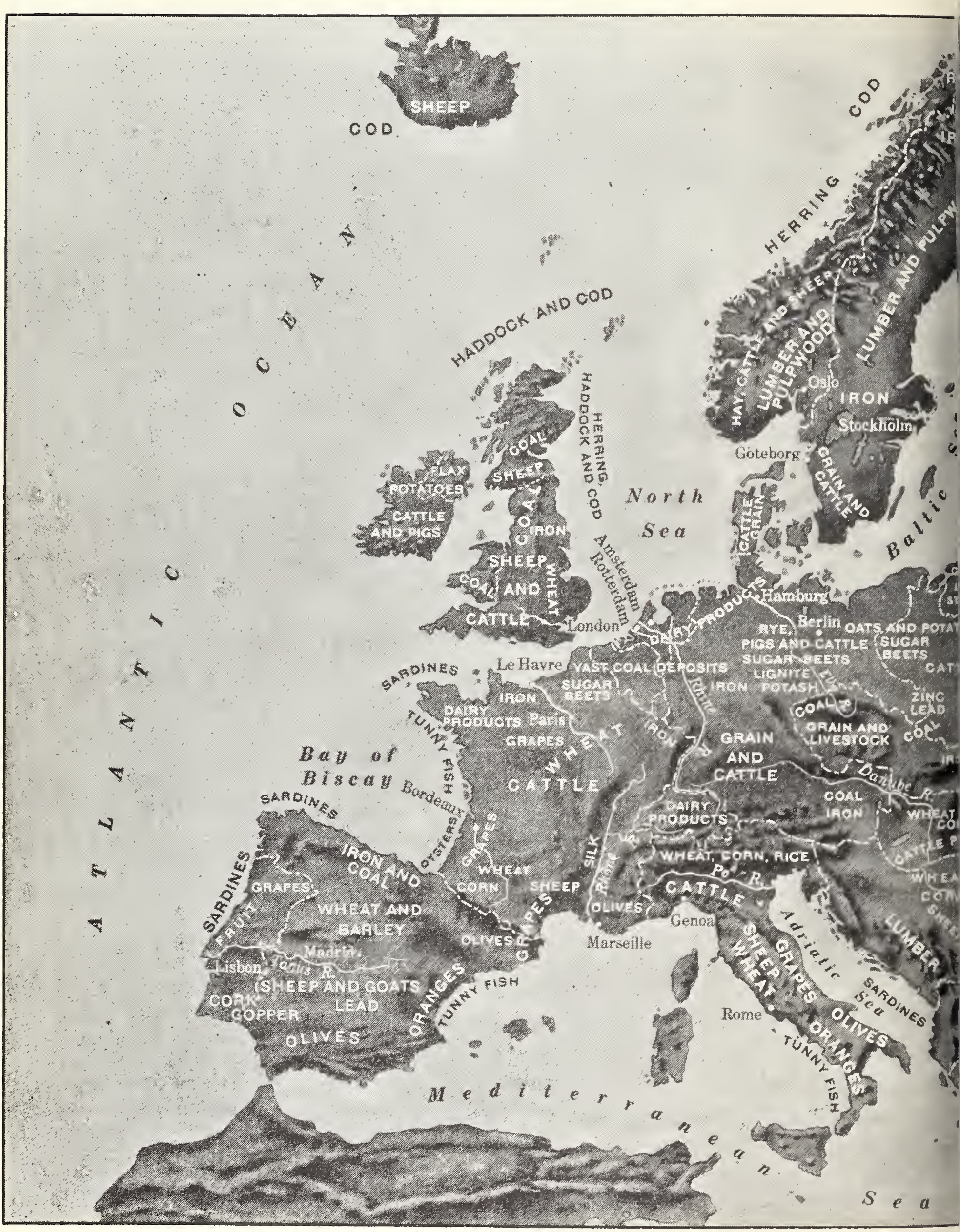
Rome Became the Trade Center of the Known World

Ships! Ships!! Ships!!! The Mediterranean was dotted with ships in those centuries just before the time of Christ. As time passed, it was the Roman ships that carried goods to and from the harbors of the known world. Roman traders were found wherever buying and selling went on. By the beginning of the Christian Era — that is, by the year 1 A.D. — Rome had become the trading center of the Mediterranean world.

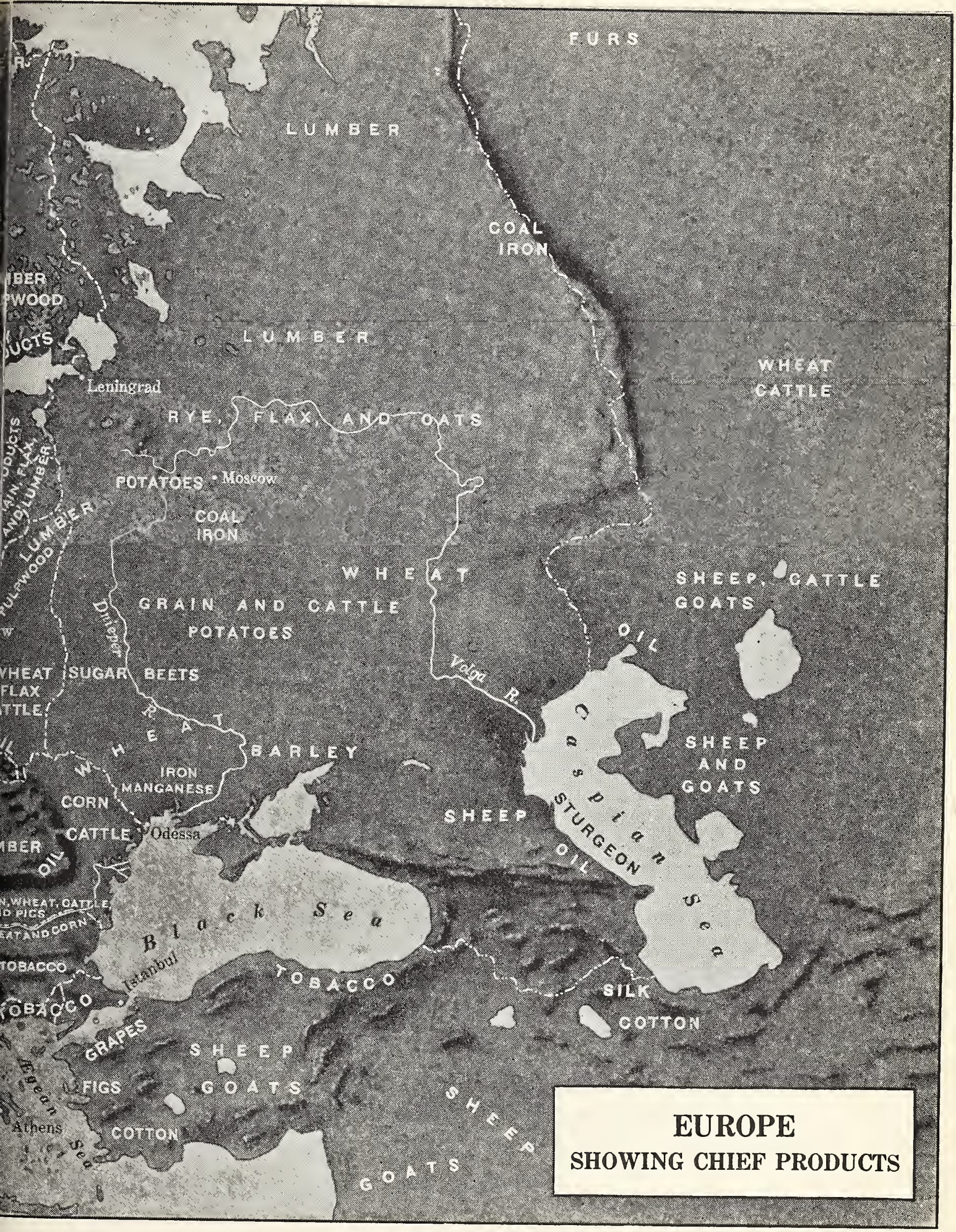
From Alexandria, the busiest port of Egypt, came wheat, linen, bright glass beads, and perfume. From Alexandria too sailed ships loaded with spices, peppers, incense, precious stones, ivory, and cotton goods that had come from far-off lands in Asia. From Syria came timber, purple dye, olives, and fruits of all kinds — apples, pears, dates, figs, plums, and grapes — as well as manufactured goods, such as woolen cloth and glass.

But farther still went the Roman traders. Even before the time of Christ they had sailed as far as India. There they picked up teak and ebony, beautiful pearls, ivory, cotton, rice, and pepper. About the year 160 A.D. a Roman ship sailed on and on and finally reached China. Soon the Roman traders were bringing back Chinese silk, which was worth more than its weight in gold. Before this time Chinese products had reached Rome by a long land route across the vast stretches of Asia, but now it was possible for them to be carried nearly all the way by sea.

Not only south and east did the Roman traders go, but west to Spain, where there was gold and lead and tin; and north to Gaul (which we now call France), where they found herds of animals, delicious wines, and fine timber. They even reached to the far-off islands of Britain, where they traded for cattle and sheep, wheat, and tin.

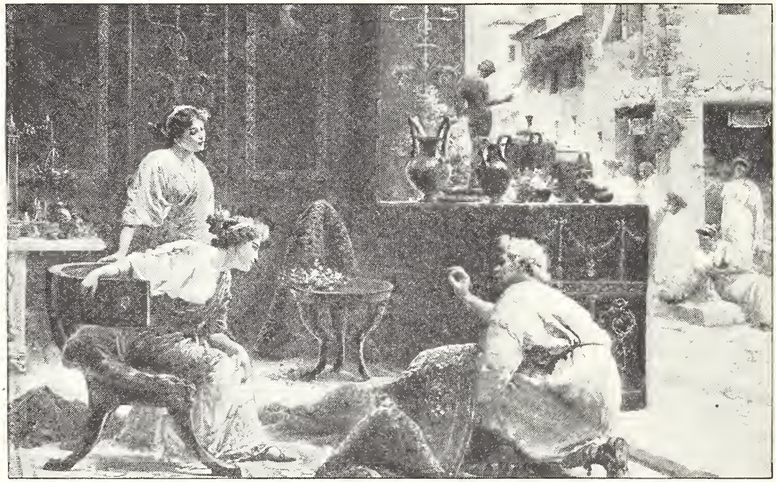

SHEEP
COD
COD
HERRING
ATLANTIC OCEAN
HADDOCK AND COD
HAY, CATTLE AND SHEEP
LUMBER AND PULPWOOD
LUMBER AND PULPWOOD
Oslo
IRON
Stockholm
Goteborg
GRAIN AND CATTLE
Baltic
HERRING, HADDOCK AND COD
North Sea
FLAX
POTATOES
CATTLE AND PIGS
COAL
SHEEP
COAL
IRON
SHEEP AND CATTLE
COAL
WHEAT
London
Amsterdam
Rotterdam
CATTLE GRAIN
DAIRY PRODUCTS
Hamburg
Berlin
RYE, PIGS AND CATTLE
OATS AND POTAT
SUGAR BEETS
SUGAR BEETS
LIGNITE
POTASH
CAT
Le Havre
SARDINES
VAST COAL DEPOSITS
IRON
SUGAR BEETS
IRON
Rhine
COAL
GRAIN AND LIVESTOCK
ZINC LEAD
COAL
DAIRY PRODUCTS
Paris
GRAPES
WHEAT
IRON
GRAIN AND CATTLE
TUNNY FISH
Bay of Biscay
Bordeaux
CATTLE
Danube R.
COAL IRON
WHEAT
SARDINES
OYSTERS
GRAPES
DAIRY PRODUCTS
SILK
Rhone
WHEAT, CORN, RICE
Po R.
IRON AND COAL
GRAPES
WHEAT
CORN
SHEEP
GRAPES
CATTLE
SARDINES
FRUIT
WHEAT AND BARLEY
OLIVES
OLIVES
Genoa
Marseille
Madrid
Lisbon
Tagus R.
SHEEP AND GOATS
CORK
COPPER
LEAD
OLIVES
ORANGES
TUNNY FISH
SHEEP
WHEAT
GRAPES
Adriatic Sea
SARDINES
LUMBER
Rome
OLIVES
ORANGES
TUNNY FISH
Mediterranean Sea

MAP 13



EUROPE
SHOWING CHIEF PRODUCTS

MAP 13



E. Forti

Fig. 93. From this painting of a rug shop how much can you tell of the arts and crafts and trade of Rome 2000 years ago?

Thus by land and by sea the trade routes of the world led to Rome. Across deserts, over mountains, through forests, across stormy seas, from every part of the known world goods came to the city on the Tiber.

Rome, the Richest City of the World

What did this vast trade mean to Rome? It meant, first, that fortunes were made by the merchants who traded with the far lands of the world and by the bankers who lent money to carry on that trade. Every wealthy man of Rome had his own town house and one or more villas in the country. Often thousands of dollars were spent on a single banquet at which many kinds of rare dishes were served. Expensive silks were used in making the clothes of the rich. An endless number of rare things were imported from the East.

The city itself, with its open square, or forum, surrounded by public buildings, showed this wealth and luxury. There were public baths, temples, triumphal arches, and places of amusement.

Thus we see that Rome had changed much since the early days when the simple farmers, stock-raisers, and craftsmen gathered in the old market place. Rome had become a center of art and learning, for her people brought to the city whatever money could buy.

The Romans Copied the Arts of Earlier Civilizations

Trade with foreign lands also had its effect upon Rome. It brought her people into touch with the advanced civilizations of Egypt, of western Asia, and especially of Greece. During the years when Rome was rising to power the influence of Athens and the other Greek cities had spread to all the countries around the eastern end of the Mediterranean.

Alexandria in Egypt had become more Greek than Egyptian, for Greek art and Greek thinking had developed there. The museum in Alexandria had become a famous center where well-known philosophers and scientists passed on to their pupils their own ideas and what they had learned from others. The museum had a fine library containing all the best books of the time.

Through these contacts with Greece, with Alexandria, and with other Eastern cities, the Romans learned much. Their art, their architecture, and their writings show this very clearly. Compare, for example, the architecture of the Romans with that of the Greeks (figures 89, 90, 92, 95, and 96). Even the stone arches which the Romans so frequently built had been invented in the Eastern world. In fact, most of the arts of Rome were copied from the older civilizations.

Rome: Center of a World Empire

This vast trade resulted finally in the great Roman Empire. What does "empire" mean? It means "all the lands and people ruled by a government." For example, today the government of Great Britain rules India, Canada, Australia, and many lands in Africa and other parts of the world. All of these lie outside the territory of Great Britain. These lands and people, together with those of Great Britain, therefore, make up the "British Empire." There is also a French Empire, an Italian Empire, a Japanese Empire, and others.

Now there had been empires before the days of Rome. The Egyptian, the Babylonian, the Assyrian, and the Athenian governments had conquered lands outside their own territories and had ruled over them. So in ancient days Egypt, Babylon, Assyria, Persia, and Athens, each had had an empire.

But the Roman Empire far surpassed all others in size (map 14). Extending clear around the Mediterranean, it included northern Africa and western Asia. It reached west and north through Europe and into the British Isles. All these lands were conquered by Roman trade and Roman armies. All were ruled from the central government at Rome.

Before the days of the empire Rome had been a republic; that is, it had a partly democratic government, somewhat like that of Athens. Then during the five centuries which began just before the birth of Christ the empire was ruled by an emperor. He was in almost complete control of the government.

The provinces, or regions outside of Rome, were ruled by Roman officers, the chief of these being called the proconsuls. The government in each of the provinces was very well organized. It changed each region, making it more Roman and drawing it closer to the world which had its center in the Mediterranean.

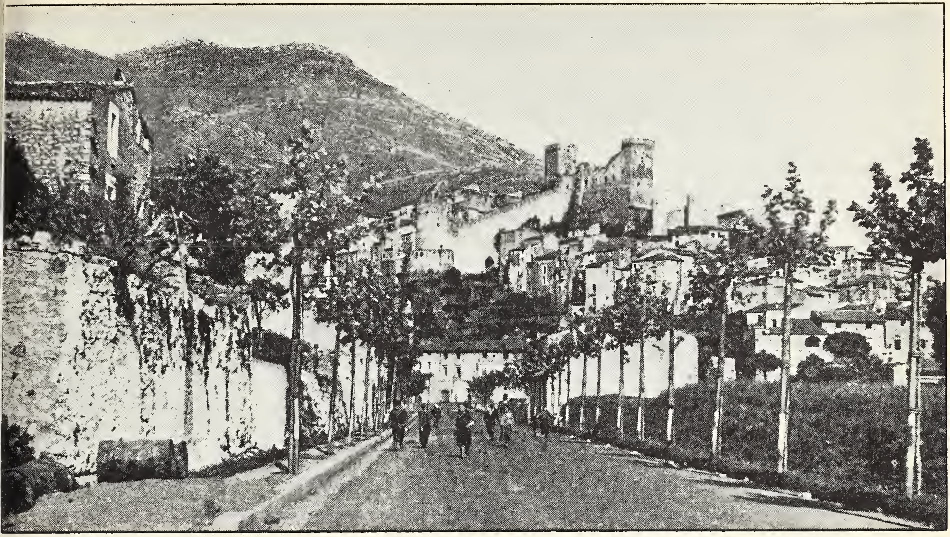
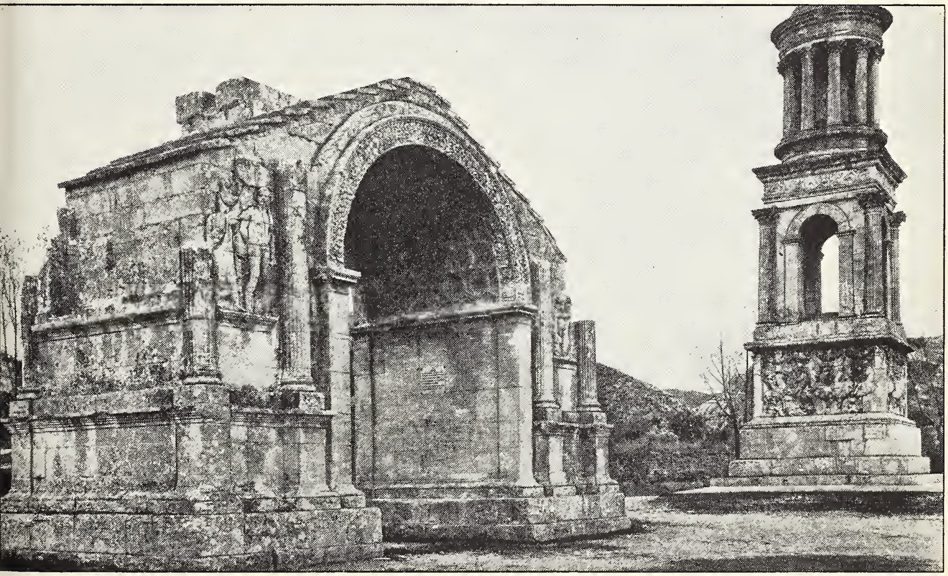


FIG. 94. The Appian Way, which led from ancient Rome far across Europe 2000 years ago, is still being used today



Ewing Galloway

FIG. 95. This arch of triumph and tomb at Saint-Rémy in France are relics of the ancient Roman Empire

The Romans Were Great Builders

In a few hundred years this vast region was tied together by the government of Rome. Wonderful roads, some of which exist even today, were built throughout the empire, making trade and travel between one part and another easy. Over the rivers sturdy stone bridges were erected. To the larger towns of the provinces, as well as to Rome itself, aqueducts brought supplies of fresh water. For these bridges and aqueducts, as well as for great stadiums, the Romans made better arches than had their teachers, the Indo-Europeans of the Near East (figure 95). They invented concrete — a mixture of limestone, cement, gravel, sand, and water — and made buildings so massive that many are still standing today. In many of the towns there were forums and amphitheaters and fine public buildings, just as in Rome.

Even Gaul and Britain were drawn into the circle of Mediterranean civilization and were finally tied to the Roman lands. The people there had been barbarians until the Romans taught them more civilized ways. Finally the whole Western world became the empire of Rome.

What the Latin Language Did for Civilization

There was one thing especially that helped the Romans to bind the peoples of the Western world together. That was the use of the Latin language all over the Roman Empire. The word *Latin* comes from the name of an Italic tribe, the Latins, who lived long ago — 700 B.C. and before — on the south side of the Tiber River.

How the Latins happened to settle on the Tiber in Italy, we do not know. Neither is it known where they came from nor when they moved into the peninsula. Some scientists think they came down from the north with other Indo-Europeans of the New Stone Age. These scientists say also that the Latin speech was not like the Semitic languages, which were spoken to the south in northern Africa, but that it belonged to the Indo-European family, which we discussed in Chapter XIII.

At any rate, there, near the village called Rome, lived the Latins. And slowly, although other peoples conquered them, their language began to be used by more and more people. At first, of course, it was a very simple, spoken language. We have no records of their writing before the time when the Phoenicians and later the Greeks began to trade with them.

Recalling the Making of the Alphabet

Again we see how inventions are made — not altogether by one man or by one people but by many people. Consider how the alphabet and written languages developed around the world. In *Man at Work: His Arts and Crafts* you saw how the Seirites of the Sinai peninsula invented the first alphabet about 1800 B.C., starting with Egyptian hieroglyphic writing. The Semitic and Hamitic peoples passed it along northern Africa, up and down the Arabian Desert into Babylon, Assyria, Chaldea, Syria, Palestine, and Phoenicia. Through 1000 years and more the Hamitic and Semitic written languages grew with the use of these alphabets. The Old Testament of the Bible written in Hebrew is a well-known example of writing with one of these very ancient alphabets (figure 84).

As the Indo-European tribes of the north came into contact with the Semites of the Near East, they too learned to write with an alphabet.

In somewhat the same way, the Cretans learned the use of the alphabet before 1400 B.C. Whether theirs came from Egypt directly or from Asia Minor, we do not know.

Roman Letters

A	B	C	D	E	F	G	H	I	K	L	M
N	O	P	Q	R	S	T	U	V	X	Y	Z

Roman Numerals

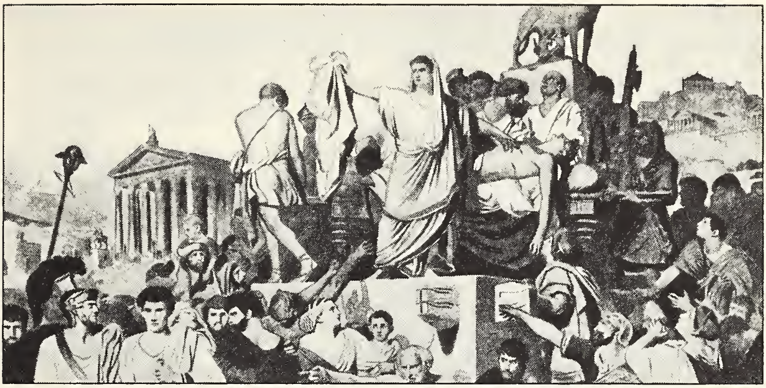
I	VI	XI	XVI	XXI	XXVI	XXXI
II	VII	XII	XVII	XXII	XXVII	L
III	VIII	XIII	XVIII	XXIII	XXVIII	C
IV	IX	XIV	XIX	XXIV	XXIX	D
V	X	XV	XX	XXV	XXX	M

In the 700's B.C. the Greeks began to use written language, and out of it grew the Greek alphabet. It was with this alphabet that the world-famous Greek poems and plays and history were written.

Who scattered these alphabets around the world? The traders! They spread the art of writing by means of their bills of sale and their coins. It was the numbers and words on the bills and coins which introduced the ideas to the more simple peoples.

The Greek traders came in their ships to the Tiber and unloaded their goods on the docks along the water's edge. Written receipts had to be given; written records of sales had to be made. The Greek merchants kept their accounts in writing. From them the Roman traders learned to keep accounts in writing also. At first they used the Greek letters and numbers. As generations passed, the Romans changed them into letters and numbers of their own. At last they became what we know today as the Roman alphabet and numerals. See the chart above. What letters of our alphabet are missing? (Figure 84 shows some of the Roman letters and compares them with earlier ones.)

Before the 300's B.C. the written language of the Romans was very crude; indeed, it was not much more than an imita-



Bettmann Archive

FIG. 96. Mark Antony giving his funeral speech after the killing of Caesar, the great Roman warrior and leader

tion of the Greek. A few Romans had learned to read Greek poems and plays, but very little writing was done in Latin.

Then came the 200's and 100's B.C. During those years Roman poets began to write in their own Latin language. Ennius (239 B.C.–169 B.C.) was perhaps the most important of these. Time passed. As more Latin authors appeared, the writing became better. Steadily the language improved.

Then came the Golden Age of Literature in Rome. This was the hundred years from about 80 B.C. to 20 A.D. During this period several world-famous Romans wrote their great books. There was Cicero (106 B.C.–43 B.C.), the orator and author. He wrote speeches, letters, and the like in a style that has hardly been surpassed in 2000 years! There was Caesar, the general and ruler, who wrote *Commentaries on the Gallic War*. There were several poets, two of whom are famous today: Vergil (70 B.C.–19 B.C.), author of the Aeneid, a long epic poem about the founding of Rome, and Horace (65 B.C.–8 B.C.), author of *Odes and Epodes, Satires and Epistles.*

Thus, by the first century A.D., the Latin language had become one of the finest written languages in the world.

The Romance Languages

We must remember at the same time that very few people in the Roman Empire could read. How many? We do not know, but we can estimate that it must have been only a small per cent — perhaps two or three people in a hundred. Most people could communicate only by spoken language. This was *not* Latin, but a kind of new "Roman" language. Soldiers and others carried it all over Italy. They took it to Gaul (which later became France) and over to the Iberian Peninsula (which later became Spain and Portugal). They spread it northeastward down the Danube River valley into the region that became Rumania. Gradually the people of all these regions began to speak dialects that were like the original spoken Roman speech.

We shall study later how the people in these regions built up their own languages — the Italian, French, Spanish, Portuguese, and Rumanian. And it must be remembered that each of these grew out of the old spoken Roman language. For that reason we speak of those five Indo-European languages as Romance languages.

Latin itself, however, became the one *written* language for all of Europe for the next 1500 years! Of course only a very few could read and write Latin. Among them were authors and the officials of the government and of the church. As we continue the story of the European peoples, however, we shall find that all the European *written* languages were based on Latin.

It should be said in passing that although the Roman language was widely used in the European and Mediterranean world, the Roman numbers were found to be too inconvenient. Instead the Arabic-Hindu numerals were used.

A Hint of the End of the Great Empire

It must have seemed to the people of Rome at the time of the 100's A.D. that so strong an empire would last forever. Surely a power that could hold so many different lands together would never fall! Certainly one that could change barbarians into civilized peoples and teach all under its control the Roman ways of doing things would be too powerful ever to be overthrown! These things they believed.

But they were mistaken. Before the year 500 A.D. the Roman Empire was in ruins. Civilization had been practically wiped out of Europe and had been seriously set back in western Asia and northern Africa. In fact, the whole Mediterranean world had been shattered into many parts.

Many different reasons have been given for the "fall of Rome." No one knows what all the causes were. We can only suggest a few of them.

The conditions of life among the people of Rome itself were unfavorable. The great wealth of the city had gone into the hands of a few people. Most of the people of Rome were poor, and as time passed they grew more and more miserable. The farming land which had once been divided into many small plots had fallen under the control of a few landlords. Year by year those who no longer owned land flocked to the city. There they found work hard to get; for most of the work in Rome, as in Athens, was done by slaves. Wages were very low.

In Rome, then, a large part of the population came to depend upon the emperors to keep them alive. Their food, for the most part, consisted of free grain which the emperors supplied. What amusements they had also came from the emperors. There were chariot races and plays performed by actors. There were combats of gladiators, men who were trained to fight in the arena for the amusement of the spectators.

With this kind of one-sided life — a few wealthy persons and a large number of poverty-stricken people — Rome itself grew weak. As time went on, her people became less and less able to withstand the attacks of the barbarians who came down from the north. You see from your map that these tribes lived beyond the Rhine and Danube rivers in the forests and on the plains, lands untouched by Mediterranean civilization. As Rome became weaker and weaker, the attacks upon the empire became stronger and stronger. Soon disaster could be seen around the corner. But we shall save that story for later.

Books You Would Like To Read

ANDERSON, PAUL L. Swords in the North. D. Appleton-Century Company, Inc., New York.

BEST, SUSIE M. Glorious Greece and Imperial Rome. The Macmillan Company, New York.

BULWER-LYTTON, SIR EDWARD. The Last Days of Pompeii. Charles Scribner's Sons, New York.

GUERBER, H. A. Story of the Romans. American Book Co., New York.

HAAREN, J. H., and POLAND, A. B. Famous Men of Rome. American Book Co., New York.

KING, GORDON. The Rise of Rome. Doubleday, Doran & Company, Inc., Garden City, New York.

LAMPREY, LOUISE. Children of Ancient Rome. Little, Brown & Company, Boston.

MACGREGOR, MARY. Story of Rome. Frederick A. Stokes Company, New York.

MILLS, DOROTHY. Book of the Ancient Romans. G. P. Putnam's Sons, New York.

ORVIETO, LAURA. The Birth of Rome. (Translated by Beatrice C. Oberholter.) The J. B. Lippincott Company, Philadelphia.

SCALES, MRS. L. W. Boys of the Ages. Ginn and Company, Boston.

TAPPAN, E. M. The Story of the Roman People. Houghton Mifflin Company, Boston.

TREBLE, H. A., and KING, K. M. Everyday Life in Rome in the Time of Caesar and Cicero. Oxford University Press, New York.

WALLACE, LEW. The Boys' Ben-Hur. Harper & Brothers, New York.

PART V

How Europe Built the New Industrial Civilization

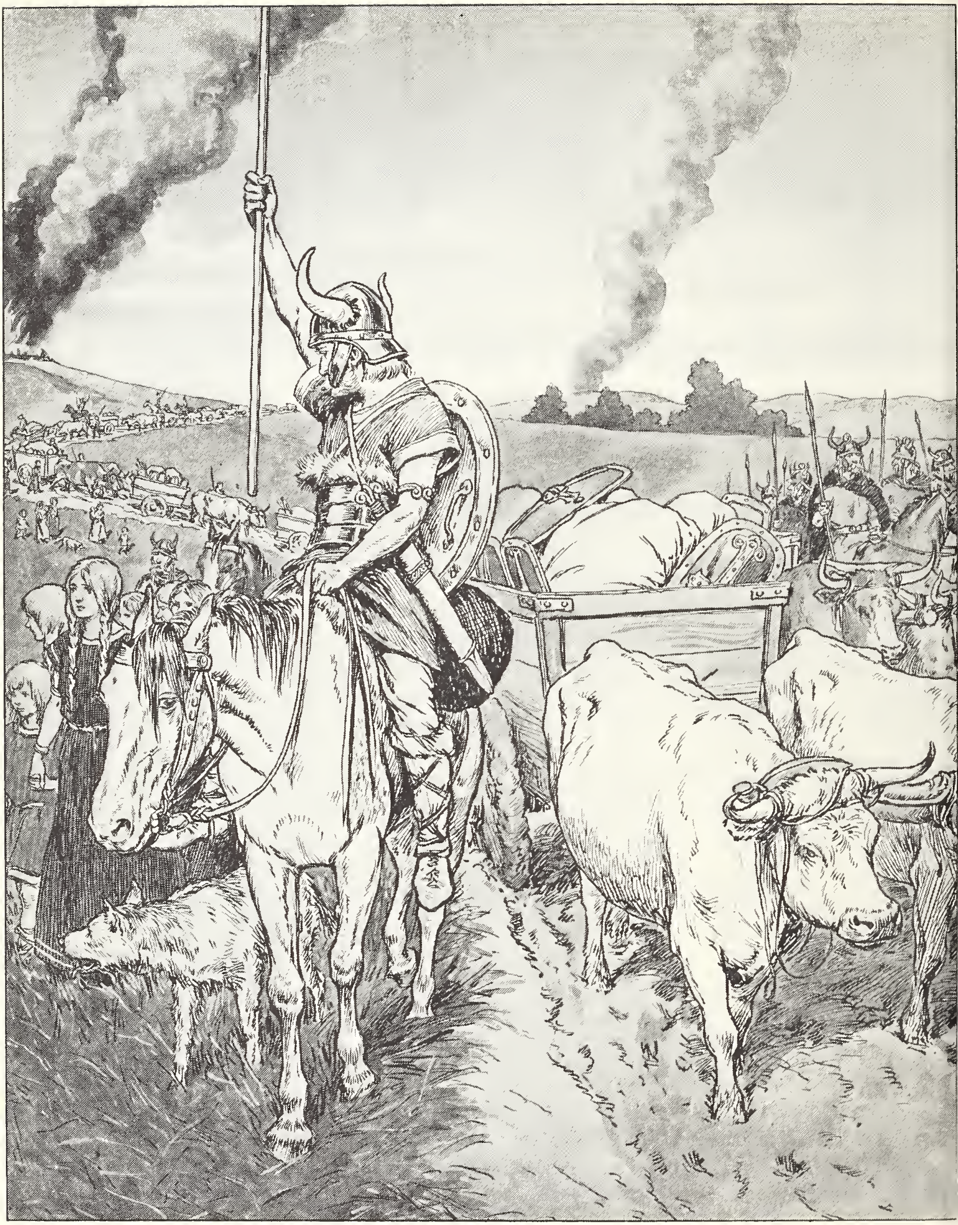


FIG. 97. This German tribe, fearing an attack by the Romans, has burned its homes and is moving to a new place

CHAPTER XVII

Dark Days in Europe before the Rise of Civilized Countries

A Glimpse of Roman Life about 400 A.D.

IF IN the year 378 A.D. you could have flown quickly over the Roman Empire, you would have seen a strange mixture of ways of living. Every kind of civilization known to the people of the Mediterranean world would have passed before your eyes.

In the city of Rome itself hundreds of families were living in stone and concrete buildings or in brick and mud houses along narrow, paved streets. Thousands of people were busy buying and selling at the docks along the river Tiber and in the markets and shops of the city. In the huge Colosseum more thousands were watching a chariot race or, perhaps, a combat between gladiators. Many others were idling about, for work was hard to get. To these people grain and other foods were distributed free.

Upon getting your last glimpse of Rome you would have said to yourself: "Here is a large city with beautiful architecture and arts, with stores and shops, with a forum surrounded by government buildings. Boats come and go over the Tiber, and trading ships from around the known world are anchored at the docks. Rome is certainly a very civilized community."

Yes, Rome was that; and yet you would have left it with a feeling that the great days of only a few hundred years before, when Caesar and Augustus were the rulers, had gone.

Something was wrong at Rome. The people seemed discontented. There was much quarreling among them. No one seemed loyal to the emperor any more.

One of the most disturbing things was the coming of the barbarians from the north. Strange names were being spoken — names of wild tribes who were said to be entering the Empire without the government's permission. There were the Goths, who lived far to the east beyond the Danube River, the Teutons of central Europe, the Vandals of the Far North near the Baltic Sea. The Angles and Saxons had already crossed the North Sea and had settled in Britain without even declaring war. To make matters worse, the Roman government itself had no strength, no plans. No one region could count on Rome for protection against these "barbarians."

Times were certainly changing! Rome was no longer the powerful center of a great empire.

Suppose next that you flew north over Italy and followed one of the five main roads along the lovely Mediterranean coast into Gaul (France). You would have looked down on a life that seemed to be peaceful enough. From time to time a Roman villa would catch your eye. This was not merely a beautiful mansion surrounded by lawns and shrubbery. Around it a whole village of pleasant huts and little shops was built. Here every kind of craftsman was at work — blacksmiths, weavers and tailors, shoemakers. There were craftsmen making daggers and swords, shields and spears, out of copper, bronze, and iron. Smiths working with gold and silver turned out jewelry and other things for decoration. Well-cultivated farms were laid out on the outskirts of the village.

Thus the average Roman villa of those days — whether it was in distant Britain or in Spain or in Gaul — was a complete community of several hundred inhabitants. Most of these people, however, were slaves They either had been captured in war or were the children of earlier captives. A few were freemen, working for wages. A tiny handful were wealthy owners for whom the slaves and the freemen worked. There was little buying and selling in the community. The workers of the villa produced nearly everything that was needed — everything, of course, except spices and other things that only tropical regions could produce. Here, indeed, was a certain kind of civilization.

Roman villas in many parts of Gaul! Roman villas across the English Channel, in Britain! Roman villas from the North Sea to the Rhine River! Roman villas up the Rhine and eastward along the Danube! Everywhere you would have seen the countryside dotted with Roman villas.

At farther distances apart you would have looked down on cities — Arles, Orleans, Toulouse, Paris, Treves, Cologne, Strasbourg in Gaul; London, Bath, York in Britain; Salzburg in Illyricum. And looking at each you would have exclaimed, "Another Rome!" For each, although smaller in numbers of people, was quite like the capital city. Its forum, its stadium, its public baths, and its stone bridges with arches were much the same.

If, then, you had flown over the whole Roman Empire in the later years of the 300's or early 400's A.D., you would have seen civilized ways of living like the ones we have described.

Less Civilized Tribes Were Coming into the Empire

What was beyond the borders of this large empire? What would you have found if you had flown to the north and looked down on the European plain from the Denmark peninsula, across the Elbe, the Oder, the Weser rivers — yes, to the Vistula? If you had then flown south to the Danube and eastward down that great river to the Black Sea, what would you have seen? Very different sights indeed! Here were hundreds and hundreds of miles of uncut forests and everywhere were hundreds of acres of almost uncultivated plains.

"Wilderness!" you would say. "Just like our own America when it was being settled."

Yes, very much like that. There were thick forests and rolling open plains covered with grasses. There were many, many wild animals to be hunted. Rivers were well stocked with fish.

"And were there no people at all in this vast land?" you ask.

Oh, yes, there were people. But not many, and they were not living in towns and cities or on any Roman villas. They were what the Romans called barbarians.

New Names on Roman Lips

The Romans were not the first to speak of the people who lived in the Far North as barbarians. For centuries the educated Greeks had called everyone barbarians who could not speak the Greek language. After that the Romans had used that name for those who did not know Latin. But by the 100's A.D. barbarians meant especially the strange peoples of the north of Europe about whom everyone was speaking with such dread.

Who were these tribes of barbarians?

The "Germans"

Although there were many separate names for the tribes living to the north of the Roman Empire, they were generally called Germans. For a long time this name included a mixture of many tribes, but gradually it came to mean three different groups (map 14). There were the West Germans, who lived in the neighborhood of the Rhine and Elbe rivers. To the east of them were the East Germans. To the north, in the Scandinavian peninsula, were the North Germans.

As early as 98 A.D. a Roman named Tacitus had written a book called *Germania*, which we can still read today. In it he describes a warlike tribe of partly nomad people living in the marshes to the south of the Baltic Sea and in the forests of central Europe. Although they had weapons of bronze and iron and ornaments of gold, their way of living was hardly more advanced than that of their New Stone Age ancestors. They still hunted wild beasts, although they kept flocks and herds and did a little farming. Their houses were crude huts made of branches and twigs bound together with cords.

"Who would leave Asia or Africa or Italy to come to Germany, with its desert aspect, its harsh climate, its lack of cultivation, — a dreary world!' wrote Tacitus.

It is not strange that a man who lived in warm and sunny Italy should find the cold forests and unhealthful swamps of northern Germany dreary. In spite of what Tacitus thought of the land, however, he called the people "the noblest race of Germans." He told of the strength of their huge bodies, of their courage in war, of their dignity, and of their honor.

Pliny, another Roman writer, did not think so highly of the Germans. He said:

"There a wretched race of men must seek refuge on the hillocks or in dwellings . . . raised above the highest known tides. When the water covers their neighborhood (at high tide), they are like sailors; when it goes back, they are like shipwrecked folks. The fish going out with the tide are caught close by the huts. . . . [But] liking their barbarism, these men actually declare that if they were to be conquered today by the Roman people, they would call it slavery." [1]

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[1] Adapted from Francis B. Gummere's *Germanic Origins*, p. 35. Charles Scribner's Sons, New York, 1892.

No doubt these huge northerners, with their flowing yellow hair and their blue eyes, had many of the good qualities which Tacitus described. Like other nature peoples, such as the American Indians, they were strong and courageous, not wishing to be conquered.

Over this northern plain covered with forests tribes of these people lived about 40 or 50 miles apart. On your airplane trip you would have seen, perhaps, 50 little villages. Each village might have about 100 rough timber and mud houses. Some men farmed little plots of land. But, on the whole, they depended for their food on fish and on the meat of animals which they raised and hunted. Often whole villages of these people would pick up their belongings and move, for they did not live long in one place.

When the tribes were on the move, they rode on horses which their ancestors had taught them to tame. Their belongings were carried in great heavy wagons. You can see, therefore, that they were civilized enough to use wheeled vehicles. They had fine metal swords and daggers, shields and other weapons, and interesting helmets to be used in times of war.

Most of all they loved battle. Their warriors — about 100 to a village, perhaps from 4000 to 5000 to a tribe — were among the most daring fighters of all Europe. In warfare the fighters of one village always joined together. To their enemies they seemed to be entirely unafraid of death. One of the old German songs gives the words of a dying tribesman hero:

"And if my kin be minded to weep when I am dead,
Go tell the best and dearest that this is what I said:
They must not wail and mourn me, there is no reason why;
A king's right hand hath slain me, a lordly death I die."[1]

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[1] Adapted from Francis B. Gummere's *Germanic Origins*, p. 233. Charles Scribner's Sons, New York, 1892.

Although these Germans were brave in many ways, they were often cruel and without mercy. For example, when a warrior died, his wife had to die with him. Then, too, human beings were often sacrificed to their gods.

In brief, such were the ancient Germans who dwelt during the latter days of the Roman Empire in the plains and swamps and forests of what is now northern Germany.

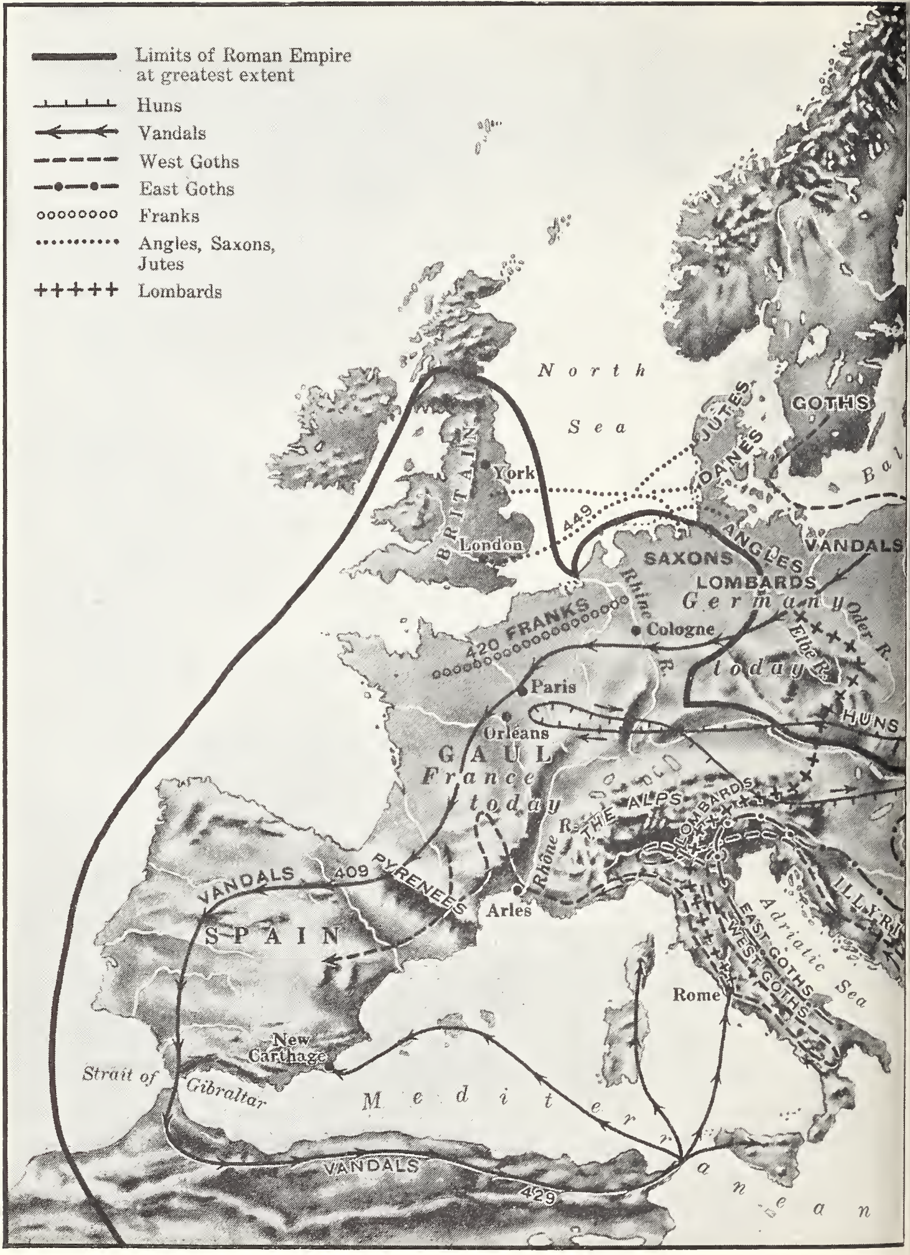
The Slavs

Away to the north and east of the Romans, where Poland and Russia are now, were other tribes called Slavs. Off in their marshlands they were no more civilized than the Germans. Little is known about them, but they seem to have been somewhat more peaceful. They devoted more time to agriculture. But of the art and science and writing, of the luxury and splendor of the lands around the Mediterranean, they knew nothing.

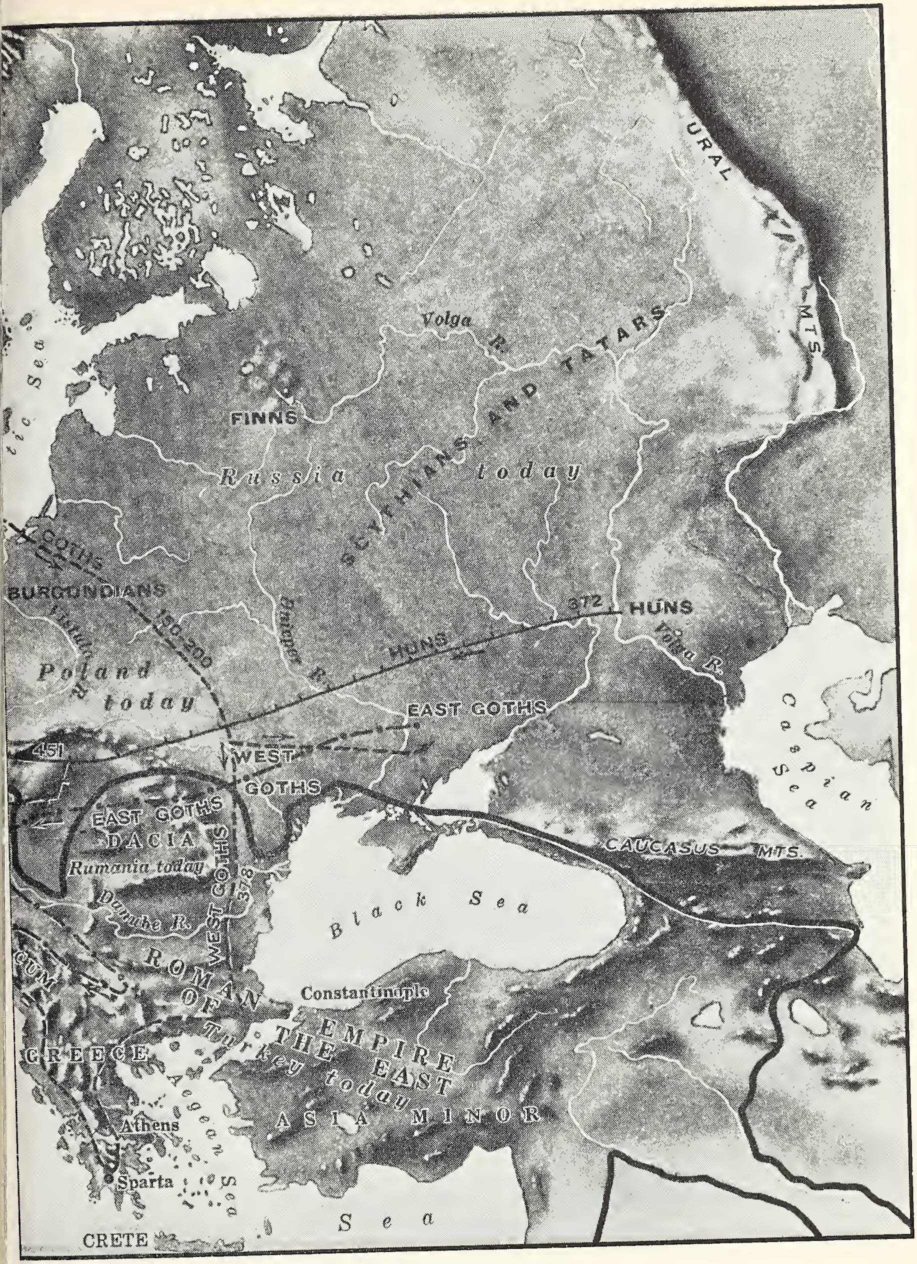
The Barbarians Attacked the Roman Empire

For hundreds of years these half-settled, half-wandering tribes gave the Roman governors of the north much trouble. A hundred years before Christ the West Germans had crossed the Rhine. At that time the Roman general Marius and his armies had a hard time to beat them back. Fifty years later Julius Caesar, the great Roman leader, fought war after war to keep them out of Gaul. One hundred and fifty years later the emperors of Rome were building forts and walls along the Rhine and the Danube to hold the barbarians outside their lands.

But still they came! Still they broke through! Why were they so eager to push southward?



Map 14. The Roman Empire, showing the



routes of the invading barbarian tribes

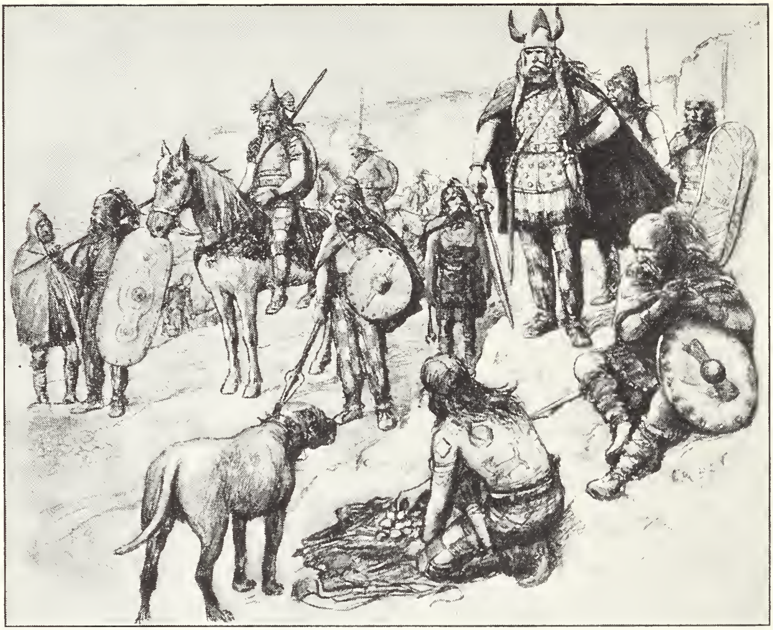


Fig. 98. An artist imagines the Germanic warriors ready for battle with the Romans, whom they attacked and conquered. (From a drawing by A. Forestier)

History Repeats Itself

There were many reasons, of course. Some, the more adventurous ones, came for the excitement of battle and for what they could take from farms and towns of the civilized people. But the most important reason was the desire for a better living. You have seen this reason at work before.

Do you recall how the herdsmen on the steppes of Asia pushed their way into lands where grasses could be found for their animals?

Do you remember how the desert Bedouins of Arabia were constantly looking for water holes and oases? for new wet grass? For thousands of years they attacked the peaceful people of the Fertile Crescent so that they could get the food and other things which they wanted.

For the same reason the Indo-European tribes of Iran and Asia Minor had attacked Babylonia and Assyria, Chaldea and Egypt. Always the desire for a better living, for more food, for more things, for an easier life.

Other Indo-Europeans, the Greeks, moved into Europe and captured and destroyed Crete.

Later the Romans did the same thing to the Greeks and Carthaginians and the peoples all the way around the Mediterranean Sea.

And now it was happening to the Romans themselves. New peoples, stronger and more daring nomads, were coming into their territory.

History *was* repeating itself, indeed!

Slowly the Barbarians Settled in the Empire

By the late 100's A.D. the Roman emperors decided to treat these barbarians differently. Instead of trying to keep them beyond the Rhine and the Danube, they said, let us bargain with them and let them stay. So the Romans gave the tribes land; the tribesmen joined the Roman armies.

This arrangement was begun during the reign of Emperor Marcus Aurelius (161–180 A.D.). During the next 200 years thousands and thousands of the barbarous tribesmen came southward and settled inside the Roman Empire. Of course this happened very slowly. One tribe here and another there moved farther and farther southward from their first homes. By the late 300's A.D. they were scattered over Europe from Gaul (France) to Russia.

On map 14 (pages 308–309) notice the names of the chief tribes and where they were living about 400 A.D.

In northern Gaul, the *Franks.*
In Denmark (Jutland), the *Jutes* and *Danes.*
In northern and western Germany, the *Angles* and *Saxons,* the *Lombards, Burgundians,* and *Vandals.*
In central and northern Russia, the *Scythians* and *Tatars* and *Finns.*
North of the Baltic Sea, the *Goths,* divided into *East Goths* and *West Goths.*

Do you see names in that list that suggest to you the names of peoples in important countries today? What about the Franks? the Angles and the Saxons? the Finns? the Danes? Have you heard of names today that sound like those?

The Great Wandering of the Tribes, 375–500 A.D.

By the end of the 300's A.D. larger and larger numbers of barbarians came sweeping into the lands of the Roman Empire.

The Asiatic Huns Started It

It seems to have been the Huns who started these great new movements (map 14). They were a fierce and warlike people from central Asia who in the late 300's and early 400's A.D. poured across the plains of what is now Russia. From there they rushed into the valley of the Danube. Panic arose wherever they appeared on their shaggy ponies. One writer of the time called them "men with faces that can scarcely be called faces, rather shapeless black collops of flesh with tiny points instead of eyes . . . little in stature but lithe and active, skillful in riding . . . with broad shoulders, hiding under a barely human form the fierceness of a wild beast."

No doubt they were cruel and murderous, these Mongolians from the plateaus of central Asia; but whether they had less mercy in their plunder and murder than the other peoples of that time, it is hard to say.

The Goths Took Italy and Rome

You can see from the map that in moving westward these Huns had to meet the East Goths and West Goths, who lived at that time in the plains north of the Black Sea. At their coming the Goths — men, women, and children — fled across the Danube into the Roman Empire. Farther and farther westward they streamed through the mountains until they came to the Alps. Under a great leader, Alaric, they poured through the passes of the Alps and south into the valleys of Italy. Finally they reached the very gates of Rome! Although stopped for a time by the Romans, they finally entered the city. In 410 Rome was theirs.

The whole world at the time was startled at the news of the fall of Rome. The forts and walls which Rome had built in the days of her strength had been broken. Through the mountain gaps flowed tribe after tribe of these barbarians.

Other Tribes Enter Gaul and Italy

The whole empire, too weak to resist, was at the point of being swallowed up by barbarian tribes. The Vandals forced their way through Gaul and Spain and then across the Strait of Gibraltar into northern Africa. The Franks, half naked and armed with barbed javelins and axes for throwing, took possession of Gaul. The East Goths — two or three thousand men, women, and children, both freemen and slaves — drove forward into Italy, where their king took possession of the Roman throne. And, last of all, came the Lombards, or Longbeards, who settled in northern Italy.

The Angles and Saxons Settled in Britain

Even to far-off Britain, where people had learned the ways of civilized life somewhat as the people of Gaul had done, the flood of barbarism came rushing. The Angles and Saxons and Jutes, who lived in the northern part of the German lands, sailed across the North Sea to the British shores. At first they came in small groups, chiefly to rob and plunder.

A Roman living in Britain wrote to a friend who was an officer in the Roman fleet. At this time the fleet was looking out for the pirate boats of the Saxons. The Roman said:

> When you see their rowers, you may make up your mind that every one of them is an arch pirate. . . . This is why I have to warn you to be more than ever on your guard in this warfare. Your foe is of all foes the fiercest. He attacks unexpectedly; if you expect him, he makes his escape; he despises those who seek to block his path; he overthrows those who are off their guard; he cuts off an enemy whom he follows; while, for himself, he never fails to escape when he is forced to fly, and more than this, to these men a shipwreck is a school of seamanship rather than a matter of dread.[1]

The barbarians were terrifying enough when they made a sudden attack and then departed with what they had stolen. But far worse things were to come. After one such raid a group of them stayed on and spent the winter in Britain. The next year came new bands, and the year following still more. They settled along the coast and then moved farther and farther inland. By this time the Roman soldiers had been called back to protect Rome. The Britons alone were no match for these warlike tribes, and gave way before them. On came the invaders, bearing fire and slaughter.

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[1] John Richard Green, *The Making of England*, pp. 16–17. Harper & Brothers, New York, 1882.

All Europe, It Seemed, Was on the Move

During the 300's, 400's, and 500's A.D. the whole continent had fallen under the power of the barbarian peoples. Of the terrors which their plundering caused, a man of the time wrote:

> If the whole ocean had swept over this country, it would not have made more horrible ravages. Our stock, our fruits, our harvests have been taken from us. Our houses in the country have been ruined by fire and water. The small remnant left to us is deserted and abandoned. This is only the smallest of our sorrows. For ten years the Goths and Vandals have been making a terrible slaughter among us Castles built upon rocks, villages situated upon the highest mountains, even cities surrounded by rivers, have not been able to protect their inhabitants against the fury of these barbarians. . . . Why were so many young children swallowed up in the same killing? . . . The tempest has swept away the good and the bad, the innocent and the guilty.[1]

The Decay of Roman Civilization

You can imagine that after these waves of terror and plunder little of the beauty of ancient Roman civilization remained. The fine buildings of the Romans were in ruins, and no new ones were erected to take their place. No more were aqueducts and roads built. No more were statues and wall decorations carved. No more did men become interested in philosophy, poetry, and history. Almost no people were left who could read or write. Of certain parts of this period we know very little, for no records were left to tell the story.

Nor was there a strong central government at Rome to keep order and to carry out public works. The lands over which she had held sway had fallen away. The inhabitants and the invaders were at war. Robbery, burning, looting, and murder were usual events. Small rulers — chiefs, kings, landowners — were trying to get control over each other. For the most part, every section of the old empire was in a state of confusion.

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[1] F. Martroye, *L'Occident à l'époque byzantine; Goths et Vandales* (1904), pp. i–ix. From Dana Carleton Munro and George Clarke Sellery's *Medieval Civilization*, pp. 44–45. The Century Company, New York, 1908.

We say today, "By 500 A.D. the Roman Empire had fallen!"

The Europe of 500 A.D.

The story of how new nations and new governments arose in Europe need not concern us much at this time, for our real study is "how civilizations grew." The rise and fall of kings and emperors is only one small part of that story. But we do need to know the outline of what happened.

Enough has been said to let us see that by 500 A.D. the Franks and the Goths, the Angles and the Saxons, had divided the Roman Empire fairly well among themselves.

The Franks had taken nearly all of former Gaul and the western part of what is now Germany and had made of it the kingdom of the Franks.

The kingdom of the West Goths covered most of the Iberian Peninsula, including what is now Spain and Portugal.

The kingdom of the East Goths was Italy and a bit of land to the north and east of the Adriatic.

The Eastern Roman Empire had held together and kept the land from the Balkans to Asia Minor, and the East Mediterranean lands to Egypt.

The Angles and the Saxons occupied much of England.

For Several Hundred Years the History of Europe was Made by Fighting Men

You can understand now why the 600 years from about 500 to about 1100 are sometimes called the Dark Ages. Hundreds of years passed while the wandering tribes under

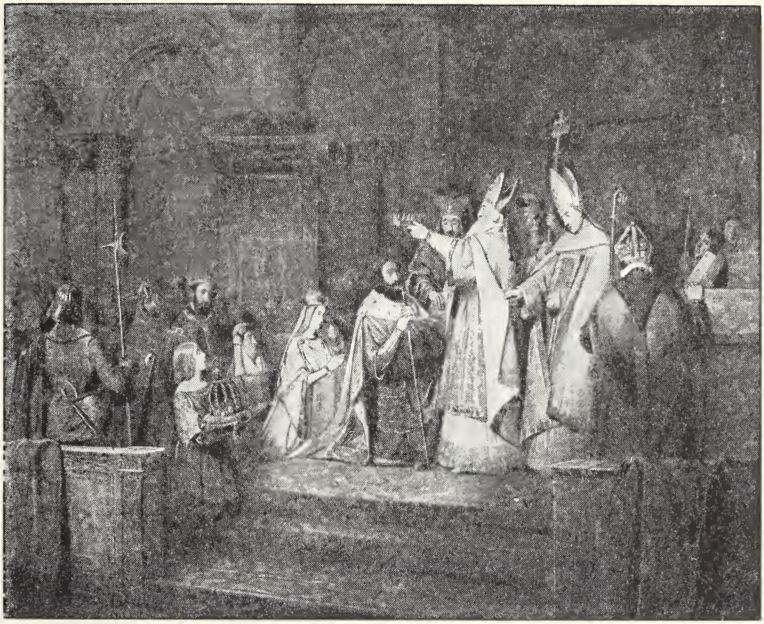

Fig. 99. Coronation of Charlemagne in Rome on Christmas Day, 800 A.D.

fighting leaders gradually settled down in the land from Scandinavia and Russia to Spain. We must remember that these peoples were well named barbarians. They really lacked most of the civilization that the Mediterranean peoples had built in the 4000 years before this time. They had yet to learn the arts of farming and housebuilding, of road-making and town-building, of the manufacture and trade of goods. For hundreds of years to come most of their leaders and all of the common people would not even know how to read and write. Of books they had few. And, of course, they knew little of sculpture or of painting, theater, and music.

So the 500's, 600's, and 700's passed. Most of the people began to settle down to till the soil and otherwise make their living in their crude villages. The warriors fought one another for more land and more power. Those who won the battles and the wars took both. Gradually the more daring and clever persons came to be called "kings."

In the year 800 Karl, who was the leader of the Franks, became the most powerful of all the "kings." During that year he went to Rome, where the Pope crowned him Emperor of the Roman Empire. So powerful was he that he is remembered in history as Charlemagne, or by his Latin name Carolus Magnus, both of which mean "Charles the Great." It was he who made the Franks the strongest of the German tribes.

But in 814 Charlemagne died, and his empire, first divided into three parts, soon separated into smaller and smaller pieces. Then it was that less important rulers — dukes, counts, and kings — fought one another for land and power all the way from Spain and France to Russia. First one and then another would rule over a larger and larger territory. But sooner or later the children of these nobles lost the lands, and the rule passed to some other leader.

For well nigh 600 years this fighting and killing, this burning of villages and towns, had gone on throughout Europe. Compared with the glorious days of the 400's B.C. in Greece, or the 100's B.C. or 100's A.D. in Rome, it was, indeed, the Dark Ages.

There Were Some Remnants of the Old Times

Of course not all the learning was lost during those days. In the lands over which Rome had once ruled, some people still spoke the language which had come from the Romans. Out of this old Roman speech the modern languages which we call the Romance languages slowly grew. Thus the language of the Romans influenced the later European languages.

It was the Christian Church, however, which really preserved some of the ancient learning. Although most of the people could not read or write, the priests and monks in the monasteries knew the works of the ancient philosophers and poets. It was one of these monks who said, "One time Cicero charmed me, the sons of the poets delighted me, the philosophers shone upon me with golden words, and the sweet sirens sang to my intellect." In the monasteries the works of earlier times were copied by the monks. It is to these handwritten copies that we owe much of our knowledge of ancient literature.

And yet the Church distrusted and feared the learning of the past, as we know from many stories of the time. There was Saint Odo, Abbot of Cluny, who loved to read the Roman poet Vergil, but who dreamed one night that he saw a beautiful vase filled with writhing serpents which came out and tried to strangle him. The serpents, he decided, were the false teachings of the poet, and the vase was the book of Vergil.

The Eastern Roman Empire Lived on for 1000 Years!

However little of the civilization of ancient days remained in most of Europe, there was one place which was quite bright during those dark days. This was Constantinople, far over in the eastern part of Europe, on the Bosporus. There, even in the 800's, 900's, and 1000's, when most of Europe seemed asleep, learning was far from dead. Beautiful buildings were being erected, paintings and mosaics were being made, and a lively trade was being carried on. In the 1100's a Jew, Benjamin of Tudela, wrote of the city:

> Great stir and bustle prevail at Constantinople in consequence of the meeting of many merchants, who come here, both by land and by sea, from all parts of the world for purposes of trade. . . . At Constantinople is the place of worship called St. Sophia. . . . It contains as many altars as there are days in the year. . . . All the other

places of worship in the whole world do not equal St. Sophia in riches. It is ornamented with pillars of gold and silver, and with lamps of the same precious materials. . . . The tribute which is brought to Constantinople every year from all parts of Greece, consisting of silks, and purple cloths, and gold, fills many towers. These riches and buildings are equaled nowhere in the world. . . . The Greeks who inhabit the country are extremely rich, and possess great wealth in gold and precious stones. They dress in garments of silk, ornamented with gold and other valuable materials. They ride upon horses, and in their appearance they are like princes. The country is rich, producing all sorts of delicacies, as well as abundance of bread, meat, and wine.[1]

Thus the magnificence of the Europe of olden times lingered on only in the small Eastern Roman Empire at the east end of the Mediterranean Sea.

Books You Would Like To Read

JOHNSTON, C. H. L. Famous Cavalry Leaders. L. C. Page & Company, Boston.

LAMPREY, LOUISE. Children of Ancient Britain. Little, Brown & Company, Boston.

MACGREGOR, MARY. Story of France. Frederick A. Stokes Company, New York.

MARSHALL, H. E. Island Story: A History of England for Boys and Girls. Frederick A. Stokes Company, New York.

TAPPAN, E. M. England's Story (revised edition). Houghton Mifflin Company, Boston.

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[1] C. Bayet, in Lavisse et Rambaud's *Histoire Générale,* Vol. I (1893), pp. 672–682. From Dana Carleton Munro and George Clarke Sellery's *Medieval Civilization,* pp. 213–214. The Century Company, New York, 1908.

CHAPTER XVIII

The Narrow World of the Europeans in the Middle Ages

How Large Is the World in Which You Live Today?

"WHAT AN absurd question!" you may think. "How large is the world in which I live? Why, as large as the earth itself."

Yes, that is true. Most boys and girls of today know something of the whole earth with its six continents and the "seven seas." They know also about the chief countries and the large cities of the earth, the mountains, the plains, and the deserts.

Two happenings in the past few centuries have made it possible for us to know the world. First, nearly all the earth has been explored by men. Second, swift transportation and communication bring information and goods to us daily from all parts of the earth. In the newspapers we read items from San Francisco, Boston, London, Paris, Cairo, Peiping, Rio de Janeiro, or Cape Town. Over the radio we hear reporters tell of the news in distant lands. Our woolen suits may have come from the backs of English sheep, and our silks from the silkworms of China or Japan. We may dine at a table covered with Irish linen and drink coffee from Brazil, served in cups made in Canton, China.

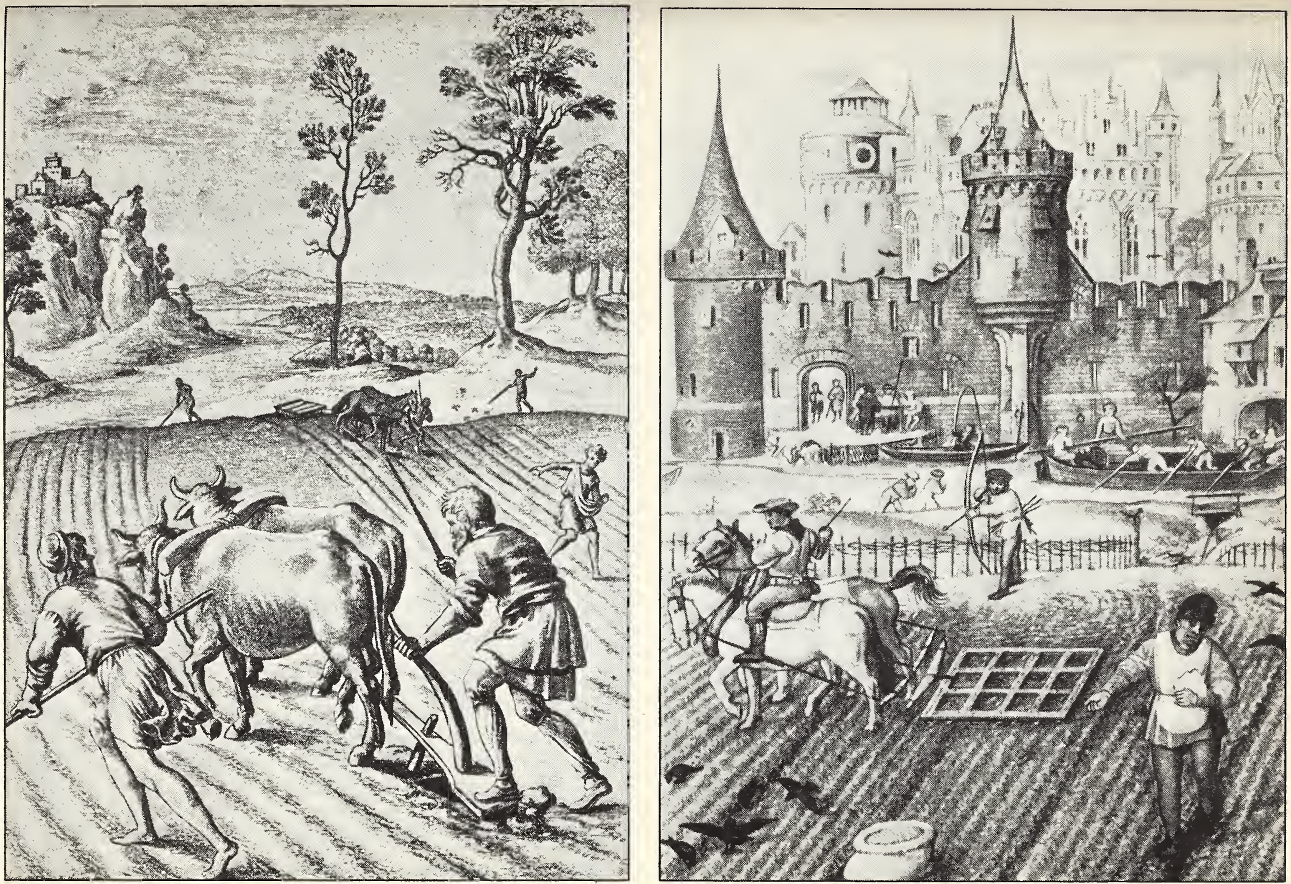
Today the entire earth is indeed our world. We can keep in touch with nearly all of it.

Did the People of 1100 A.D. Have a World as Large as Ours?

Perhaps you smile at that question, for you know that the earth itself has grown or shrunk very little since 1100. At that time the same continents were surrounded by the same oceans and seas. People sailed on the same rivers and climbed the same mountains. The Chinese lived in their junks and built their temples. The Japanese held their cherryblossom festivals. Pilgrims in India bathed in the Ganges River and lived on the same rice diet as they do today. People in Europe lived in the same general locations, although there were not so many of them nor so many towns and cities.

Turn back the pages of history to a morning in 1100. You find yourself in England. You meet a farmer and ask him, "What is your world?" Can he answer, "My world is the whole earth"? No indeed; for he knows only the small part of the earth that is near his farm. You ask him if he knows of China, and he remarks that he has never heard of such a country. You ask the same question of a nobleman whom you meet. His answer is the same as the farmer's, for the world of even the most educated European was narrow indeed.

These years were still the Middle Ages, that long period between about 400, when the Romans lost their control of Europe, and 1500 or 1600, when modern times began. A few scholars had maps which showed a world as large as that of figure 101. It included most of Europe, some of Asia, and a narrow strip around Africa. But to most people the little neighborhood in which they were born, with a few miles added perhaps to villages close by, was the entire world. They could not travel far or often. There were but few roads, and those were very bad. Much of the land was covered with forests, and it was not safe for one to travel alone. An occasional trip on foot or on horseback to the next village was a real adventure.



Bettmann Archive

Fig. 100. Two glimpses of life in Europe during the Middle Ages. Peasants at work near the castle of the lord

Let us imagine that we are back in the Middle Ages, flying in a magic airship over Europe. We have left Alexandria, in Egypt, and have crossed the Mediterranean Sea. We have passed over Venice, the city of canals. Here and there are castles each surrounded by little villages. We have looked down on Paris, dirty and crowded, but even now beginning to be an important European city.

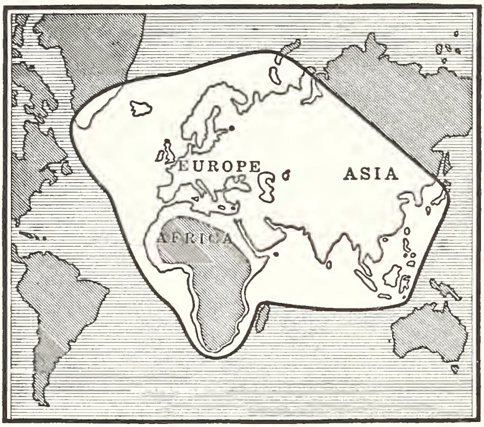


Fig. 101. The line which incloses Europe and parts of Asia and Africa indicates the lands which were known to a few scholars as the "world" in the Middle Ages. The darkened area within the line had not yet been explored

Now we are over London. The houses are low, built of wood, with roofs covered with straw. How quiet and sleepy the city is! Oxen walk slowly through the streets pulling handmade carts. Little donkeys with heavy burdens on their backs trot along. In the country around we see no steel mills belching smoke, no factories, no electric telegraph wires to dim our view.

Where and how do the people live?

Life in Little Settlements Called Manors

In this Europe of 1100 there are few towns and cities. Most of the people live in manors, little settlements around a large castle. We notice many such homes as we speed along, and we are eager to see how the people in them live. The castle itself, in which the lord of the manor lives, is a large gray-stone house built on a hill. There are fields and woods around it, a fish pond in the woods, and animals and birds for the lord to hunt. As close as possible to the castle are grouped the tiny cottages of the villagers. Beyond the villages are fields of grain and a huge forest which stretches far and wide. There are no roads through the forest, only rough paths.

Let us look into the lives of the people who live here.

Most of the land is owned by the nobles and knights, or by the clergy, who are officers of the church. There are a few freeholders, that is, farmers who own small tracts of land. Most of the people in the village, however, belong to the lord of the manor. He inherited them from his father, along with the land, and he must pass them and their descendants on to his eldest son.

These peasants can neither buy nor sell the land; they cannot even leave it. Like their ancestors, they were born on the land, and they must die there. They plow, cultivate, and harvest the fields. Some of what they raise they may keep for their own use, but they are obliged to give their master whatever he demands. In return he protects them in time of trouble or danger.

The peasants, who are called serfs, are divided into two classes. There are the villeins, or small farmers, who cultivate from 10 to 40 acres of lands. There are the cotters, or laborers, who work at many tasks for the lord; these have only an acre or two of land to cultivate. There are a few slaves on the manor, and most of these are the personal servants of the lord and his lady.

In those years there were many more peasants than there were nobles, knights, and clergymen.

How the Land Is Divided

On the drawing of the manor (figure 102) you can see how the land is laid out. There are three divisions — woodland and waste, pasture, and cultivated fields. In the woodland and waste the peasants are allowed to cut turf and gather wood. Their cattle, swine, and horses can graze in the pasture, together with those of the lord.

There are two large fields which border on the road: one in front of the castle, the other beyond the church. These are divided into long, narrow strips. Each villager has a certain number of strips in each field. For example, the three strips in the drawing marked with the Roman numeral I are cultivated by one serf. Those marked II are worked by another serf, and so on. Thus the land on which he raises his crops is scattered. He must travel from one field to another in order to do his farming.

Notice that the lord's land is divided into three parts — fallow, spring, and fall. This is known as the "three-field system." Each year one part lies fallow; that is, it is unplowed and unused. One part is planted to a crop that ripens in the spring, and the third is sown to some grain that ripens in the fall. The landowners of 1100 were wise farmers. They knew how to care for land and were careful not to wear it out by using it constantly. Because of this system of farming, many of the fields of Europe which produced crops in 1100 are still producing good crops today!

How Do the Serfs Pay for the Use of the Land?

Since the serfs have no money, they pay in services. The lord keeps for himself a large plot of land. This the serfs plant, cultivate, and harvest for him, in addition to caring

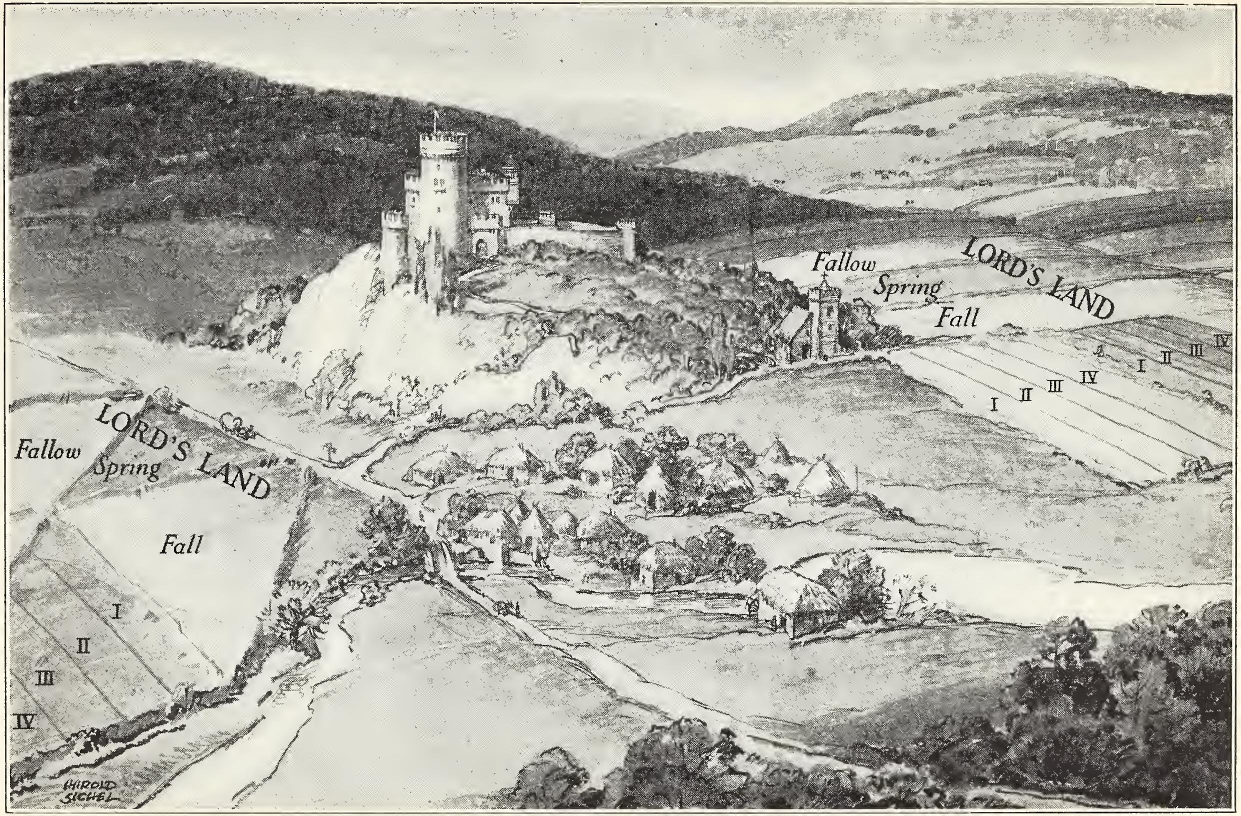


Fig. 102. A manor in England about 1100

for their own. The work is divided among them. A few days of each week are spent for the lord. The villeins usually spend three days and the cotters one day. When the seasons for planting or harvesting come, the work is very heavy. Often the peasants are forced to neglect their own fields at the time when a few days' delay means the loss of their own crops. This makes them very unhappy; but they cannot do anything about it, for the lord and his soldiers are well armed, and the serfs have no weapons to use against them.

Not only must the serfs cultivate the lord's fields, but they must give him a certain number of their own cattle, fowls, and eggs, and a certain amount of milk and garden products.

If a serf's daughter wishes to marry, the father must ask permission of the lord. If a villein wishes to sell a cow or an ox, he cannot do so without the consent of the lord. In fact, the lord has complete power over his serfs, except that he cannot buy and sell them.

The Poverty of the Serfs

No doubt you are thinking that the life of a serf is not a very pleasant one. Let us visit his house and see how he lives. His home is a crude little hut made of rough wood and mud and thatched with straw. There is only one room, and that has neither stove nor fireplace. The bare ground covered with straw serves as a floor.

The men and some of the women come in from the fields. The mother places before the family a large pot of boiled cabbage and salt pork. Everyone dips into the pot with his fingers or with a piece of bread used as a spoon. Occasionally there are fish or peas or berries. This is the chief meal of the day, perhaps the only one.

The clothing of the serfs is dirty, for there is little time for washing. In fact, washing would mean that the family would have to lie in bed all day, for two sets of clothing are very rare among these people.

It is growing dark. There is little light except a mutton-tallow candle. Tonight everyone is tired; so each person climbs a crude ladder to the attic, where he throws himself wearily upon a pile of straw to sleep until dawn.

Such was the life of the serfs in Europe of the 1000's.

You can see from these accounts that the life of the peasant was not an easy one.

Each Manor, Like the Roman Villa, Was Nearly Self-sufficient

In the villages there were other workers besides farmers. There was a smith to make the tools and a miller to grind the grain in the lord's mill. A fisherman caught fish for the serfs and for the manor house when the lord was not in the mood for fishing. Sheep were sheared, and the wool was spun, woven, and made into clothing by the women of the village. There was even a court in the manor, where the lord became both judge and jury when disputes needed to be settled.

Once in a long while a new face appeared in the village — a peddler or a wandering musician. The peddler carried what was to the peasants a magic pack. It bulged with ornaments, silks, and spices from the Orient. How they longed to buy something from the world far away, but they were too poor to make such purchases. Only the lord and sometimes the freemen could afford such luxuries.

The bard, or wandering musician, journeyed from one manor to another and sang ballads of knights and ladies or told tales of a strange world. The people's eyes gleamed as they listened, and they drew deep breaths, for these songs were very thrilling to them. When the bard had finished, he did not stay among them, however, but went on, perhaps to sing all night in the banquet hall of the castle.

Thus you can see that both lord and serf lived a shut-in life in the manors of Europe. Occasionally things were brought in from the outside. For example, the millstones used in Great Britain had to be brought all the way from France. Or the lord ordered his fine coat of armor and his strong sword from Spain. But in general the manor was a self-sufficient community.

How the Nobles Lived in Their Castles

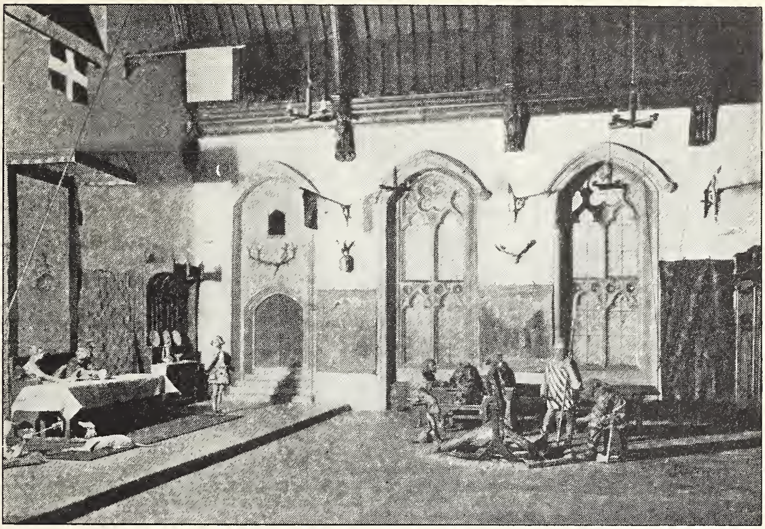
And what of the lords themselves? What kind of life did they live in their castles?

It was quite rough and uncomfortable. The castles were really fortresses, at first built of wood and later of stone. They were surrounded by a wall. Below the wall was a moat, or stream of water, across which a drawbridge was let down when members of the household or friends were coming or going.

Within the castle it was often very gloomy. Cold winds blew through the narrow openings which served as windows. Straw served as a covering for the cold stone floors. The great hall, or main room of the castle, could not be thoroughly warmed even by a huge fire.

But most castles contained many beautiful things. The walls were covered with hangings of velvet. There were plates of gold and silver, and chests full of furs and silks and velvets and jewels which were worn by the lord and his lady. These fine things came from lands far away. Even in that day peddlers or merchants appeared at the gates, bringing amber from the Baltic, furs from Russia, gold and silver, cloth, jewels, spices, and other products from the lands of Asia.

As time went on, life in the castle became more gentle.



Metropolitan Museum

FIG. 103. The great hall of a castle, giving a glimpse of the life of the nobles during the 1300's

The nobles spent less time at war, thus becoming freer to spend their time at home. Manners became less like those of soldiers and more like those of refined, peace-loving people. Gardens were made within the castle walls. Wandering singers traveled from castle to castle entertaining the lords and ladies with their songs of love and war.

You can see, therefore, that by the 1100's and 1200's the life of the rich lord of the castle was quite different from that of the serf in his poor cottage.

How the People Were Governed

The serfs and the few farmers and slaves, then, were the workers of the Middle Ages. The noble classes provided the rulers and the fighters; they formed the government and also the army. The system by which they were organized was called feudalism. Feudalism was so different from the government of the Pharaohs in Egypt, of the citizens of Athens, of the emperors of Rome, or of the President and Congress of the United States that we should look more closely at it.

Feudalism was based on the owning of land. That was natural enough, for it was the huge landowners who had taken over the power which Rome had once possessed. Gradually these lords brought the smaller landowners and the peasants under their protection and under their power. Only those who had such protection were safe from the attacks of other lords or foreign invaders. In this way the peasants became really attached to the land of the lords; and the lesser lords were under the power of the greater lords.

As huge tracts of land came under the control of the greater lords, they permitted the lesser lords to use parts of the land for themselves. In return for this the lesser lords swore to give certain services to the greater one. They had to fight when told to do so, they had to aid the lord in his court, they had to give him advice when he asked for it. Sometimes they were required to make money payments to the lord. A lesser lord was called a "vassal," and the land which he held was called a "fief."

Under the feudal system there were often several kinds of lords. The king was generally the most important of all, and the highest lords were his vassals. The highest lords would have several vassals under them; and each vassal would have vassals of his own, and so on down.

Frequently during the Middle Ages, however, some lords became more powerful than the king himself and gave him very little in the way of services.

How Children Were Educated To Be Knights

As was to be expected in a warlike age, most of the sons of noble families were trained to fight. From their births their families looked forward to the time when they would become knights and would go to war.

First, a Page

At about the age of seven the boy was placed in the court of a lord to get his education for a knighthood. He was taught to hunt and to fight. He learned a good deal about religion and much less of reading and writing. At first he was a page, dressed in a tunic which reached to the knee, a short mantle fastened at the shoulder with a gold brooch, and a close-fitting cap. He served the lord and his lady in various ways. The rules for pages were written in a *Babees Book* about 1475. Some of them were:

> Take no seat, but be ready to stand until you are bidden to sit down. Keep your hands and feet at rest. Do not claw your flesh or lean against a post in the presence of your lord. Make obeisance to your lord always when you answer, otherwise stand as still as a stone unless he speaks to thee. . . . Be ready, without feigning to do your lord service and so shall you get a good name. Also to fetch him drink, to hold the light when it is time, and if you should ask a boon of God you can desire no better thing than to be well-mannered.[1]

Then, an Esquire

At fourteen the page became an esquire and received a sword and belt. He served his lord and lady as before, was trained in the use of weapons, and was sometimes allowed to go forth on military adventures with his lord.

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[1] *Babees Book.* From Walter Clifford Meller's *A Knight's Life in the Days of Chivalry*, pp. 19–20. T. Werner Laurie, Ltd., London, 1924.

The young men followed
Lances and bassinets they carried
Of the older knights,
And learnt the way
To ride, and they saw
The three modes of arms.
Then they became archers.
At table and everywhere they served
And the baggage they packed
Behind them right willingly;
Thus they used to do
And in the kitchen did offer themselves
The esquires at this time.

Then did they become men-at-arms
And proved their worth
Eight or ten years altogether.[1]

Finally, a Knight

At about twenty-one, when the young man had proved by some courageous deed that he was worthy, he was made a knight and given his spurs. The ceremony was performed by a knight, usually his lord. While the young man knelt he was given a sharp blow with the hand at the nape of his neck and advised to be brave and be faithful.

In the early days of feudalism the knights were rough-and-ready fighters, and little more. They did not hesitate to show their power over the weak. They burned and plundered recklessly, and were too ready to kill an unarmed man or a woman if it suited them.

As time went on, however, a code of knighthood, called

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[1] Walter Clifford Meller, *A Knight's Life in the Days of Chivalry*, pp. 35–36. Translated from a poem by Eustache Deschamps. T. Werner Laurie, Ltd., London, 1924.

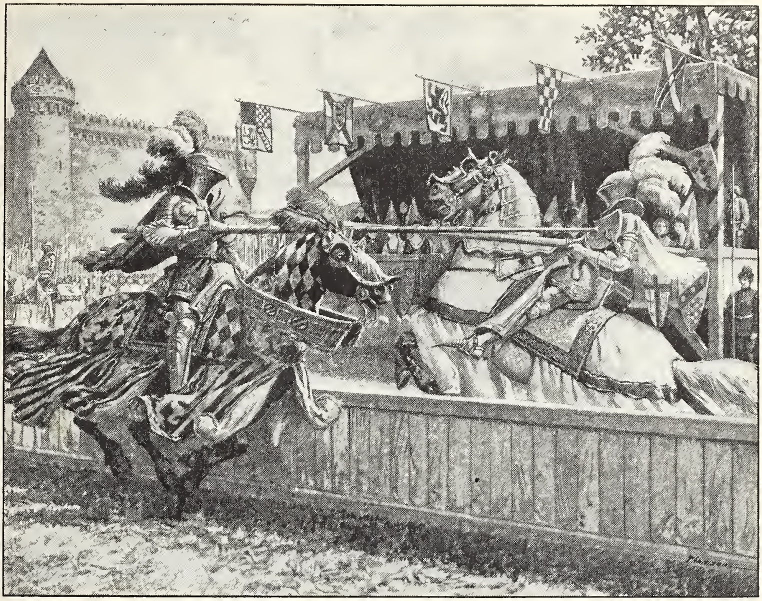


FIG. 104. In the Middle Ages knights showed their skill at arms by engaging in a game called jousting. These games were played before an audience for its entertainment

chivalry, grew up. To be a true knight, a man was supposed to be truthful, charitable to the poor, generous, and courteous — particularly to women. The knight came to be thought of as one who protected the weak.

It was interesting, this feudal society, but, as we have seen, it did not reach a very high level of civilization. It did not produce the art or thinking or science that the ancient civilizations had produced. In spite of many attractive things about it, the period of feudalism was a crude and warlike age.

Do you think the years from 500 to about 1100 are well named the Dark Ages?

What Was Civilization Like in Asia during the Same Period?

While Europe was having her dark days, what was happening on the continent of Asia, the home of the ancient civilizations?

The picture was far different from that of Europe. You remember that from Asia were coming most of the luxuries enjoyed in the castles of Europe. Southwestern Asia — the Near East — was still a hustling, thriving center of trade and thought, a region of large cities. And, as we shall see in the next section, it was southwestern Asia that helped to stir Europe out of her dark ages.

Civilization in India

In south-central Asia across the Himalayas, India was at the height of her civilization. We know that this is true from the writings of Chinese pilgrims and students who made the long trips to India to study and learn about Indian religion and thought. Of King Harsha's capital city, one of these pilgrims writes: "It was five miles long and one mile broad and had lofty buildings everywhere. There were beautiful gardens and tanks of clear water, and in it were collected rare things from strange lands."

There were, indeed, many beautiful cities in India at this time and during the following centuries. Within them were palaces and temples of stone and marble. These were decorated with sculptures and iron and gold articles made by the most skillful craftsmen. In connection with the temples, there were schools for teaching architecture, sculpture, painting, and metalwork.

Harsha had gathered together in his court many philosophers, poets, writers of plays, and other artists. Probably the most famous astronomers and mathematicians in the world of that day lived in India a little before Harsha's time. People studied to be doctors and scientists. India was also one of the great religious centers of the world.

Altogether, the advanced civilization of this country presented a sharp contrast to the ignorance of the Europe of that time.

Civilization in China

In China the picture was much the same as in India. In the 600's — after a period of darkness and disorder — began a period which the Chinese have always considered one of their most brilliant. The T'ang dynasty united the country under one rule and extended its borders. During those days there were many students of philosophy and many poets. Art, literature, and learning were encouraged in every way. Even far-off Europe heard of the splendor of this wonderful land.

And so it was that at the time our ancestors had put an end to the old civilization of Europe and were only beginning to leave their barbaric ways, the civilizations of Asia were far advanced, producing many fine and beautiful things, as well as science and art and philosophy.

Thus you can see that the world of the Europeans was smaller and narrower than it had been in the days of the old Roman Empire. It was smaller than the new world of Asia. The Eastern Roman Empire and India and China were tied together by travel and trade, by the comings and goings of many ships and caravans. Large cities were bound together by common interests. The man who lived in Constantinople or Alexandria or Bagdad was the citizen of a large and busy world. Not so the European of the Middle Ages in the 700's . . . 800's . . . 900's . . . 1000's A.D. He was a backwoodsman in comparison.

Hints of a New Life Forming in Europe

Out of the destruction of the old comes the new. Old civilizations pass away, and from their ruins spring new ones. So it was in Europe in the later Middle Ages. Slowly the period of terror and confusion passed. The darkness of the centuries after the fall of Rome began to lift. New ways of living appeared. This new life grew and grew until it became the European civilization that we know today.

Books You Would Like To Read

BALDWIN, JAMES. The Story of Roland. Charles Scribner's Sons, New York.

BROOKS, E. S. Boy of the First Empire. D. Appleton-Century Company, Inc., New York.

COLUM, PADRAIC. The Island of the Mighty. The Macmillan Company, New York.

DOYLE, SIR ARTHUR CONAN. Micah Clarke. Harper & Brothers, New York.

LANSING, M. F. Page, Esquire, and Knight. Ginn and Company, Boston.

LINNELL, GERTRUDE. Behind the Battlements. The Macmillan Company, New York.

LOWNSBERY, ELOISE. The Boy Knight of Reims. Houghton Mifflin Company, Boston.

PYLE, HOWARD. Men of Iron. Harper & Brothers, New York.

PYLE, HOWARD. Otto of the Silver Hand. Charles Scribner's Sons, New York.

PYLE, HOWARD. The Story of the Grail and the Passing of Arthur. Charles Scribner's Sons, New York.

READE, CHARLES. The Cloister and the Hearth. Dodd, Mead & Company, Inc., New York.

RIGGS, STRAFFORD. The Story of Beowulf. D. Appleton-Century Company, Inc., New York.

TAPPAN, E. M. When Knights Were Bold. Houghton Mifflin Company, Boston.

YONGE, CHARLOTTE MARY. The Dove in the Eagle's Nest. The Macmillan Company, New York.

YONGE, CHARLOTTE MARY. The Little Duke, Richard the Fearless. The Macmillan Company, New York.

CHAPTER XIX

The New Birth of Europe, 1000–1500 A.D.

Once More Asia and Africa Taught Europe the Arts of Civilization

TIME AFTER TIME we have seen how the people of Asia and Africa taught those of Europe to live in better ways. Cretans and Aegeans had learned from the civilizations of Egypt and Mesopotamia. The barbarian Greeks had become civilized with the aid of countries to the south and east. Later the Romans had taken over the advanced ways of the Greeks. So also in the late Middle Ages people began to build a new European civilization, partly through learning from the ancient Near East civilizations and those of the Far East.

During these years, however, there was one remarkable civilization in the Near East which was to change the Europeans a great deal. Let us turn back for a moment to see what was happening there.

The Near East: The Center of Civilization

Is it not astonishing how long the land around the eastern Mediterranean remained the center of civilization? Even while Athens was at her height and Rome was rising to power, the cities from Alexandria in Egypt to Bagdad in Mesopotamia were among the most advanced in the entire world. After Rome fell under the attack of the northern barbarians, Constantinople, on the Black Sea, continued to be a busy city of manufacturing and trade, of learning and the arts. And after Rome's power had disappeared, Constantinople became the center of the Eastern Roman Empire, which lasted for another thousand years.

During these years, however, another center of arts and crafts, of science and philosophy, could be found in the Moslem cities of the Near East (map 15, page 349). This particular civilization had been developed by Mohammed, a leader whose ideas were to be carried round the entire Mediterranean region.

The New Religion of Mohammed Preserved and Spread Civilization

About 615 A.D. rumors were spread that in the desert city of Mecca in the Arabian peninsula, a young business man named Mohammed had called himself the prophet of a new religion. At first the religion was a simple one, in which, as Mohammed said, "There is only one God, Allah, and Mohammed is his prophet." The idea of one God was not new, having been expressed in the Hebrew religion of earlier times as well as in the Christian religion which was just then beginning to spread through the world. It is also thought that Mohammed was influenced by Zoroaster, the religious leader of Persia.

In order to join this new religion, one had to believe in Mohammed's idea, say prayers regularly, give help to the poor, fast (go without food) in the daytime of one sacred month each year, make a pilgrimage to Mecca, and obey Mohammed.

At first people made fun of the new religion, and for a while only a few relatives and friends joined Mohammed. But steadily the number of his followers in Mecca increased. By 622 Mohammed had become so powerful that some leaders of Mecca who were his enemies plotted to kill him. He heard of this and escaped to the town of Yathrib, which was later to be called Medina. There his followers also grew in numbers.

Mohammed now began to lead his followers in war, hoping to conquer new peoples and make them believers in his religion. First he became wealthy by robbing caravans in the desert, as was the custom in those days. As his power grew the leaders of Mecca led soldiers against him. Once he was defeated in battle; but he kept on, and in 630 returned to Mecca victorious.

For two years Mohammed ruled Mecca as a dictator. At the same time he spread his religion over the Arabian peninsula and north and eastward toward the Fertile Crescent. Mohammedanism, as we call it, became the world's successful "religion of the sword." The Mohammedans believed that their souls would be saved if they died fighting in Allah's service. As one leader put it, "Fighting for religion is an act of obedience to God."

In 632 Mohammed died, but his death did not stop his followers from going on with their conquests. Over the Fertile Crescent, then westward to Syria, they went. One by one they took the busy trading cities. From Syria they turned their attention to northern Africa. Through the desert they followed the highroad along which so many caravans had passed between Egypt and the lands of southwest Asia.

After a number of victories they came to Alexandria, a city of the greatest beauty. The Arabs stood in wonder at the sight. Many were so impressed with the beauty of Alexandria that they settled there. They began to study the strange and marvelous things which they saw. Gradually they too became famous for their arts and crafts. Under their rule Alexandria became one of the great cities of the world between 700 and 1200.

Most of the Mohammedan armies, however, went on across northern Africa conquering every tribe along the northern shore of that continent. Many of the people became Moham-

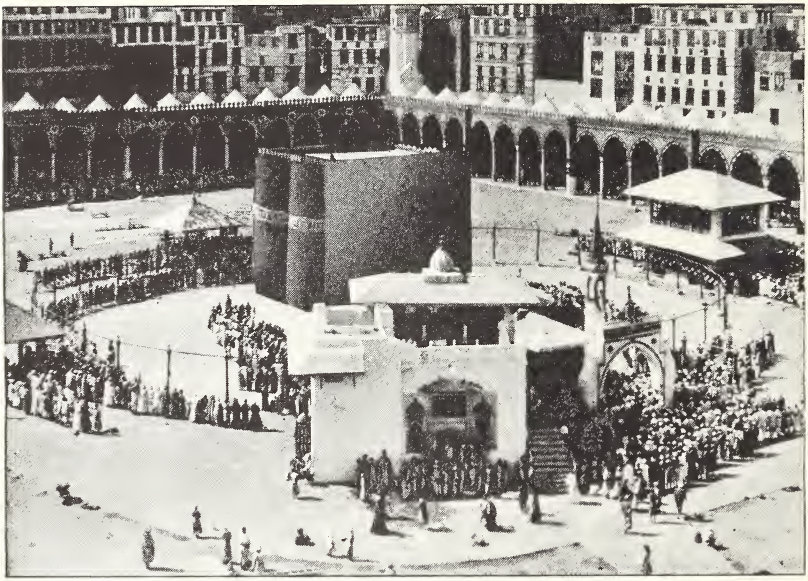


FIG. 105. Kaaba, Mecca, showing Mohammedans assembled for the midday prayer on Friday

medans. Among them were the Berbers, nomad tribes of Morocco, on the western border opposite Spain (map following page 124). The Berbers, who have been known ever since as "Moors," became some of the best fighters among the Mohammedans. They crossed the narrow Strait of Gibraltar to invade Spain in 711 and soon conquered nearly all that country.

There they built remarkable cities and carried on a worldwide trade. Among their most famous buildings is the Alhambra, a palace and fortress which still stands on a terrace near the city of Granada. It has pillars and arches made of rare marble. It is decorated with the most delicate carvings and is brilliantly colored in red, blue, and golden yellow.

By 750 the followers of Mohammed had built an empire 5000 miles long. From northwestern India to Spain it extended. It included the plateau of Iran, all the Arabian peninsula, a wide strip of northern Africa, much of Asia Minor, and the Iberian peninsula.

Trade Kept the Mediterranean the "Center of the Earth"

There were two centers of civilization in this vast empire. One was in the Near East, at the east end of the Mediterranean. The other was at the west end — in Cordova, Toledo, Seville, Granada, and the other cities of Spain.

These vast lands were held together by two bonds. The first was the religion of Mohammedanism. The second, and even more important than this religion, perhaps, was trade. Do you remember how, 1500 to 2000 years before that time, the Phoenicians had built up a trade that reached all around the Mediterranean? Well, their descendants, these new Mohammedans, did the same thing.

In 762 the Arab followers of Mohammed built their capital city, Bagdad on the Tigris River, not far from the Persian Gulf.

"The Fertile Crescent again!" you are thinking. Exactly! Century after century that fertile valley of the Tigris and Euphrates and the half-moon of rich land stretching westward and along the Mediterranean coast was an important region of advancing civilizations.

For several hundred years after 762 Bagdad became the eastern center of manufacturing, trade, and learning. It was not the only such center, however. Damascus and Aleppo in Syria, Alexandria and Cairo in Egypt, and Aden, Medina, and Mecca in Arabia, were real rivals. All these cities could boast of beautiful products. Bagdad silks and pottery, cottons and glassware and jewelry, were known far and wide.

Mosul, on the Euphrates, was famous for its cotton cloth. (Our word *muslin* comes from the name of this city.) Damascus shipped wonderful steel and iron goods as well as a remarkable kind of cloth. (Have you ever heard your mother speak of "damask"?) Aden, on the Red Sea, manufactured clothing of linen, woolen, and camel's-hair cloth. Yemen was known for its armor. Alexandria and Cairo manufactured beautiful clothes, pottery, and glassware.

Around the Mediterranean coast of Africa one could also find many bustling centers of crafts and trade.

Nor did Spain, on the west, need to take second place in the manufacture of beautiful things. It had several remarkable cities which were known all over the world. Toledo was noted for its wonderful swords and other things of fine steel. Cordova was famous for its steel shields, its leather and silk goods. Murcia was well known for its manufactured brass and iron goods; papermaking was also a very important occupation there.

Agriculture Was Highly Developed

Along with the manufacturing in the Mohammedan towns, a remarkable farming way of life had been built up. In the 5000-mile empire every kind of climate, soil, and natural resources could be found. Nearly every kind of farm product was raised. The Arabs rebuilt the old Babylonian irrigation-canal system and improved upon it. Finally they again made the entire valley of the two rivers a vast fertile plain. There the farmers raised semitropical foods, such as olives, dates, and other fruits. In the Iran-Asia Minor plateau horses were raised. In Egypt wheat, cotton, and sugar cane were grown, and horses, cattle, and sheep were raised. From India came rice, sugar cane, and oranges; from Syria, fruits; from Persia, silkworms and mulberries.

If there were space, a very long list of other agricultural products produced in this Moslem empire could be given. But these examples will give you a glimpse of the many kinds of farming that existed there from 800 to 1200.

The Learning of Earlier Times Was Preserved and Encouraged

Not only were the crafts and trade and farming important in the building of this Mohammedan civilization. The sciences, writing, and other arts flourished in the Mohammedan cities from Bagdad to Cordova in these 400 to 500 years. It was the scholars of this empire who rediscovered the fine Greek learning, preserved it, and passed it on later to the Europeans. It is to the mathematicians of the Near East that we owe the Hindu-Arabic number system we use today. It is they also who preserved the geometry and other scientific knowledge of Plato, Aristotle, Euclid, and many other Greeks.

Of course no one knows exactly how much these Mohammedans learned from the Chinese and Indians of the Far East too. Certainly before the 700's the knowledge of papermaking had spread steadily westward from China, and it continued to move westward across the Near East and Africa to Europe during the 800's, 900's, 1000's, 1100's, and later. No doubt many other ideas were being passed along in the same way.

By 1000 the Moors of Cordova and other cities of Spain were also encouraging science and literature. Students learned what the Greeks knew about astronomy and discovered many new ideas. Scholars of mathematics, history, and geography had come from the East and settled there. There were doctors of great skill. In almost every important court of Spain these men were helped and encouraged in their work. The princes enjoyed surrounding themselves with the many writers who lived in the land. Thus the cities and the courts of Spain during the days of the Moors were centers of learning and art.

We regret that there is not enough space to give the names of the famous scholars of this empire of trade and learning. Many of them hold important places in the history of the sciences. They came from many different peoples and different regions.

You can see now that while most of Europe was in its "Dark Ages" of barbarism, the Arabs in the Near East and the Moors in Spain were building one of the greatest civilizations the world had ever known. It was they also who were preserving the knowledge of art and science, of trade and crafts, which they had learned from earlier civilizations.

The Outskirts of the Mohammedan Empire in Europe

As you can well imagine, the Mohammedans could not go on conquering forever. You remember that nearly all of Spain and at one time the south of France were ruled by the Moors. In 732, however, the Frankish armies, under the daring leader Charles Martel (Charles the Hammer), defeated the Moorish soldiers at Tours, France. Never after that time was the new civilization of changing western Europe put in danger by the new civilization of the Mohammedan Arab-Moors.

In the east various Turkish tribes of Asiatic Mongols tried time after time to advance into Europe from Asia Minor. For 800 years after Mohammed the emperors of the Eastern Roman Empire at Constantinople were always strong enough to beat them back. Finally, however, in 1453 Constantinople fell to the Turks, and the Christian churches of that city became Mohammedan "mosques."

In the meantime western Europe remained much as it was when we saw it in the years from 500 to 1000 A.D.

What Was Happening in Western Europe?

You remember that at the very moment when the Mohammedans were building their civilization the people of Europe were living apart from the rest of the world in their little villages and towns.

On religious holidays people from the manor went to the church in the nearest town. After services, there were plays in the church or processions and games in the streets.

Occasionally there were fairs in neighboring villages, and the lord graciously allowed the villagers to go to them. Fairtime was exciting, and provided a welcome change to eyes so long used to seeing only familiar land and faces. It was, indeed, a well-earned rest to toilworn hands and weary backs. Along the streets peddlers and merchants put up little shops, displaying their wares and tempting people to buy. Necessities like meat, wool, salt, and fish were offered for sale, and also luxuries like wine, spices, silks, and jewels.

If a villager had a very neat piece of cloth which he had made in his home, or an extra sack of grain, he might trade it with the merchant for a bit of silk for his wife to wear on Sundays.

If the merchant refused to trade because the weaving was poor, the man might go home eager to finish a better piece of cloth before the next fair. He was willing to work harder, for he wanted to get the new things that he saw. Often home seemed dull to these people after the fair was over. Many of them became ambitious to change their way of living.

The fairs thus aroused interest in making things. They helped to develop handicrafts. The serfs tried to weave finer and finer pieces of cloth. Some spent all of their free time pounding out beautiful metal ornaments. Others carved bits of wood into handsome boxes. They made these things so that they could exchange them for others that they wanted more.

AFTER 1100 THE WORLD OF THE EUROPEANS BEGAN TO WIDEN

After 1100 two things especially brought knowledge of the civilizations of Asia to the shut-in people of western Europe: first, the Crusades; second, the stories brought back by European travelers.

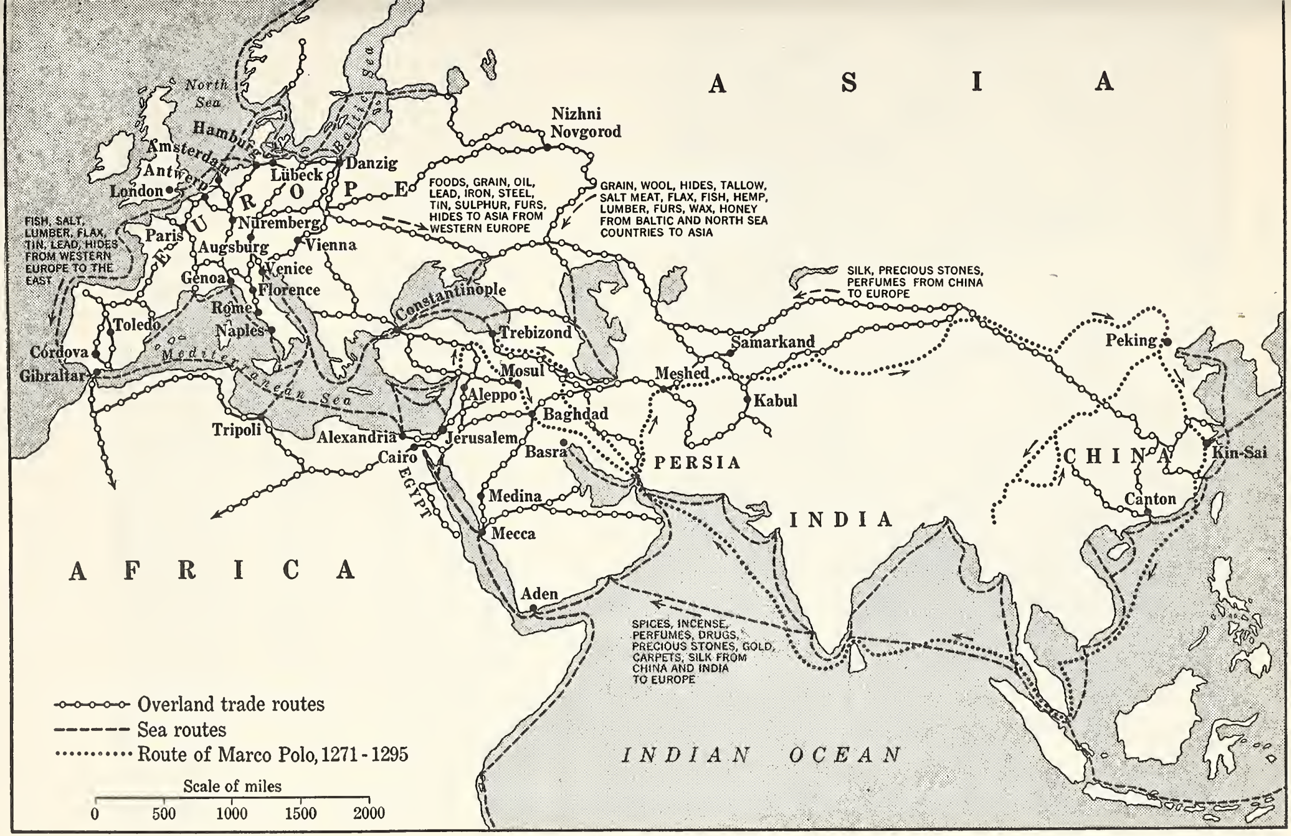
1. The Crusades (1096–1291) Opened the Eyes of Western Europeans to the Civilizations of Asia

South of Asia Minor is Palestine, the birthplace of Jesus Christ. For hundreds of years after his birth Palestine was the eastern center of the Christian Church.

After 1050 the Turks, an Asiatic people who belonged to the Mohammedan Church, captured Jerusalem and drove the Christians out. The Christians wanted to regain Palestine, and for two centuries the leaders of the Church, as well as the kings and nobles of Europe, urged their people to recapture it.

Seven expeditions to Palestine were organized. These expeditions were called Crusades. During the First Crusade large armed bands of knights and peasants went to Palestine. In 1099 Jerusalem was captured and became the capital of a Christian kingdom. From that time until 1291 the city was held first by Christians and then by Mohammedan Turks.

During the latter part of these 200 years some western-European nobles, traders, craftsmen, and peasants were living in this region called the Holy Land. These people of England, France, and other parts of western Europe began to know more and more about the civilization of the Near East. As a result trade grew rapidly between the cities of western Europe and Asia.


A S I A
North Sea
Baltic Sea
Hamburg
Amsterdam
Antwerp
London
Lübeck
Danzig
E U R O P E
Nizhni Novgorod
FOODS, GRAIN, OIL, LEAD, IRON, STEEL, TIN, SULPHUR, FURS, HIDES TO ASIA FROM WESTERN EUROPE
GRAIN, WOOL, HIDES, TALLOW, SALT MEAT, FLAX, FISH, HEMP, LUMBER, FURS, WAX, HONEY FROM BALTIC AND NORTH SEA COUNTRIES TO ASIA
FISH, SALT, LUMBER, FLAX, TIN, LEAD, HIDES FROM WESTERN EUROPE TO THE EAST
Paris
Nuremberg
Augsburg
Vienna
Venice
Genoa
Florence
Rome
Naples
Toledo
Cordova
Gibraltar
Mediterranean Sea
Constantinople
Trebizond
Mosul
Aleppo
Baghdad
Jerusalem
Alexandria
Cairo
EGYPT
Tripoli
Basra
Medina
Mecca
Aden
Samarkand
Meshed
Kabul
PERSIA
SILK, PRECIOUS STONES, PERFUMES FROM CHINA TO EUROPE
Peking
CHINA
Kin-Sai
Canton
INDIA
SPICES, INCENSE, PERFUMES, DRUGS, PRECIOUS STONES, GOLD, CARPETS, SILK FROM CHINA AND INDIA TO EUROPE
INDIAN OCEAN
A F R I C A
Overland trade routes
Sea routes
Route of Marco Polo, 1271 - 1295
Scale of miles
0
500
1000
1500
2000

MAP 15. In the later Middle Ages, when the people of western Europe began to know about the civilization of Asia, the Near East became the trading crossroads of the world

Fig. 106. When these crusaders arrived in Constantinople they were very much interested in what the merchants of the Near East had to sell

As you can see from map 15, the Holy Land was located in the very best trading region in the world. It was between Persia, India, and China on the east and Egypt, Constantinople, Venice, France, Germany, and England on the west. It was the trading crossroads of the world of the later Middle Ages.

2. European Monks and Traders Visited Asia and Brought Back Knowledge of Its Civilizations

The second thing that widened the world of the Europeans was the return of European monks and traders from Persia, India, China, and other parts of the Far East. Although Europeans knew something of the Near East, the rest of Asia was still a land of mystery. All that Europeans knew of it came from the tales told by a few traders from India and China. Then suddenly knowledge of these countries began to come to the rulers and business men of European cities; for between 1160 and 1330 a Jewish priest, several Christian monks, and many traders traveled far across Asia. Some stayed there and died; a few returned to tell of their experiences and to write accounts of what they had seen. Their stories spread from mouth to mouth and excited in others the desire to travel. Gradually more and more Europeans went forth to trade in Asia.

The names of the first and most important of the monks and traders who dared the dangers of the road to far-off Cathay (China) are known. The first was a Jewish rabbi, Benjamin of Tudela, whose travels in Asia extended from 1160 to 1173. The second was Friar John of Pian del Carpine (1245–1247). The third was Friar William of Rubruck (1253–1255). The fourth was a young Venetian merchant, Marco Polo, who went to Asia with his father, Nicolo Polo, and his uncle, Maffeo Polo. The three Polos started in 1271, arriving at the court of the Great Khan (ruler) Kublai of Cathay in 1275. There they stayed for twenty years, not returning to Venice until 1295. The fifth was Friar Odoric (1318–1330).[1]

These voyagers traveled thousands of miles on sea and on land under the worst conditions you can imagine. They were surrounded by enemies. They had to walk much of their way. They often lacked food and clothing. They had the most amazing experiences, and they saw a new world — a world of wealth and of culture much more highly advanced than their own. Fortunately for their European fellow men and fortunately for us, they wrote down (or dictated to others) full accounts of what they had seen.

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[1] Excellent editions of the journals of these travelers are found in three books upon which we have depended for our interpretation. Manuel Komroff, *The Travels of Marco Polo* and *Contemporaries of Marco Polo* (Liveright Publishing Corporation, New York, 1928); Merriam Sherwood and Elmer Mantz, *The Road to Cathay* (The Macmillan Company, New York, 1928).

Marco Polo's story is the most complete. He traveled through the territory called Mesopotamia, where he found people weaving cloth of gold and silk, and farmers raising cotton. Traders gathered there with their precious spices. In Bagdad he also found weavers of silk and velvet and busy traders.

But perhaps the most important knowledge this adventurer brought back was that concerning China. He found it a land of cities, of craftsmen, traders, and farmers. He described the capital city of southern China, Kin-Sai, in great detail. It was a "noble and magnificent" city, he said. Streets and canals wound in and out of the squares and market places. Water was being furnished to every part of the city because a lake of clear, fresh water and a large river were near by. The main street, always crowded with people, was lined with houses and mansions surrounded by gardens. Mulberry trees were everywhere; these, as you know, provided the leaves needed to feed the silkworms. There were shops in which the craftsmen worked. On market days the many squares were filled with tradesmen who had come with loaded carts and boats to carry on their business.

Just how much the Europeans were stirred by the knowledge these travelers brought back, how much by the Crusades, and how much by Moorish Spain, no one knows. But that each played a part in the new life which we are now going to notice in Europe, there is no doubt.

EUROPE AWOKE FROM THE DARK AGES

Trade and Travel Increased

When the lords and ladies of England and France and Germany heard of the rare and valuable products of the East, the simple products of the manors failed to satisfy them. So it was that merchants began to bring goods over land and sea to the castles of Europe.

From the East, particularly India and China, came articles of beauty and luxury — spices, incense, perfumes, precious stones, carpets, and rich cloths. From China there was an overland route to the Black Sea. From India the goods were brought in a number of ways — some through the Black Sea, some up the Persian Gulf and the Euphrates, some up the Red Sea and through Egypt. All the goods from the Far East were handled by the merchants of western Asia, who shipped them on to Venice and Genoa, the trade cities of Italy. From there they were sent northward by overland routes to the cities of Europe. Later the Italian traders sent ships around past Gibraltar to the ports of England and the Netherlands.

The merchants not only brought goods from the East; they took goods back to the East also. From the north of Europe, the countries on the Baltic and the North Sea, went grain, wool, hides, tallow, salt meat, fish, flax, hemp, timber, furs, and tin. These goods were sent back over the trade routes to the south of Europe and to Asia. At this time India bought many things from Europe, especially horses, linen, and weapons. To western Asia the Europeans shipped food, grain, oil, honey, lead, iron, steel, tin, sulphur, cloth, leather, wool, soap, furs, and slaves.

Soon the people of one part of Europe were using the goods which were produced in other parts of Europe. Thus the whole of Europe as well as the Mediterranean region became criss-crossed with paths of trade and travel. Map 15 shows how all kinds of products were carried hundreds of miles from lands in which they were produced to lands where they were wanted. They were carried by ships, by camel and horseback, and in crude carts.

The Dangers of Travel

Travel and trade in those days were far from easy. Whether by land or by sea, there were many kinds of difficulties of which we know nothing today. These proverbs of the day show how people felt about going on a journey:

> Never journey without something to eat in your pocket, if only to throw to dogs when attacked by them.
>
> At sea remove your spurs; sailors make a point of stealing them from those who are being seasick. Keep your distance from them in any case; they are covered with vermin.[1]

The small ships of that time were hardly strong enough for the trips they had to make across stormy seas. A traveler of the time described a voyage in these words:

> In the galley all sorts of discomforts are met with; to each of us was allotted a space three spans broad, and so we lay one upon another, suffering greatly from the heat in summer and much troubled by vermin. Huge rats came running over our faces at nights, and a sharp eye had to be kept on the torches, for some people go about carelessly and there's no putting them out in case of fire, being, as they are, all pitch. And when it is time to go to sleep and one has great desire thereto, others near him talk or sing or yell and generally please themselves, so that one's rest is broken. Those near us who fell ill mostly died. God have mercy on them![2]

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[1] E. S. Bates, *Touring in 1600*, p. 190. Houghton Mifflin Company, Boston, 1911.

[2] Ibid. p. 67.

Nor were these all the difficulties of traveling in ships. Everywhere in the seas pirates were ready to pounce down on any vessel that seemed to have a rich cargo.

Travel on land was no easier than by sea. In wet weather the roads were hardly more than mud holes. There were land pirates too — robbers and highwaymen who stole the goods of the traders and travelers. Nor were these robbers by any means always poor people; often they were the lords themselves. It was considered perfectly proper for the lords to demand tolls (taxes) for passing through their land. But they were not even satisfied with that; many of them stopped and robbed the merchants who went that way.

In spite of these difficulties, however, trade increased, drawing the parts of Europe ever closer together and tying Europe more tightly to the rest of the world.

As Trade Increased the Towns Grew

During the 1100's and 1200's towns were growing up around the castles and churches of Europe. This is what happens in any trading region. In the farming districts peddlers go from house to house and village to village selling what they can carry with them. But they cannot carry bulky goods or large quantities of goods, so trade grows very slowly. Such goods are transported and left in various centers to which people from the country can come to buy.

In medieval days fairs and markets were held at regular periods in villages near the castles or churches. There small shops were set up from which people could buy at any time. It was natural that the people who did the buying and selling should make their homes at these places, and that others should follow them. As a result the villages grew into towns, and the towns into cities.

Quaint houses and narrow streets clustered around the vast stone structure which was the lord's castle. Or perhaps they were built around one of the Gothic cathedrals which were being erected in those days. If you go to Europe today, you will find these cathedrals among the most interesting things you will see. They stand as monuments to the craftsmanship and skill of the later Middle Ages.

At the time of the Crusades the towns of northern Italy grew rapidly. Venice and Genoa, particularly, became busy trading centers to which ships came from all parts of the known world. A little later we find that some of the towns of France, Germany, and England also grew into large trading cities. The citizens who lived in these communities were neither lords nor serfs. Most of them were merchants, connected with the buying and selling of goods.

Let us look briefly at a few of the larger cities.

1. London Was Becoming a City of Busy Streets, Markets, and Workshops

Throughout the Middle Ages London was what we might call a rambling big town. The streets were very narrow and paved badly or not at all. There was a gutter running along the middle of the street, but water often overflowed into the houses when it rained. In some quarters of the city there were many beggars, and in others many thieves. Since there were no policemen and no lights, it was unsafe to walk through the streets at night. People seldom dared to go out after dark.

With the improvement in ships, London gradually became a bustling center of trade. Houses and craftsmen's shops lined the narrow streets. In those days shops were open booths, as they are in Far Eastern cities today. Trading was carried on out of doors, with much bargaining over prices.

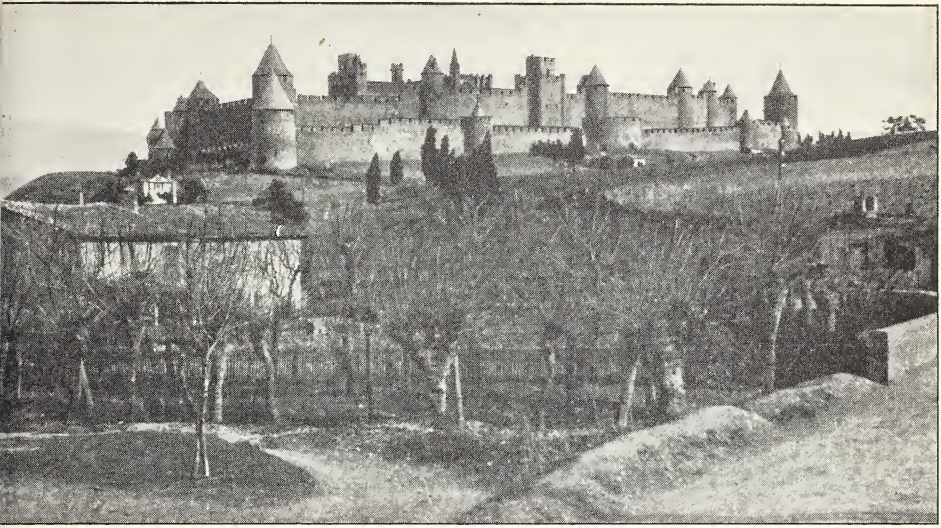
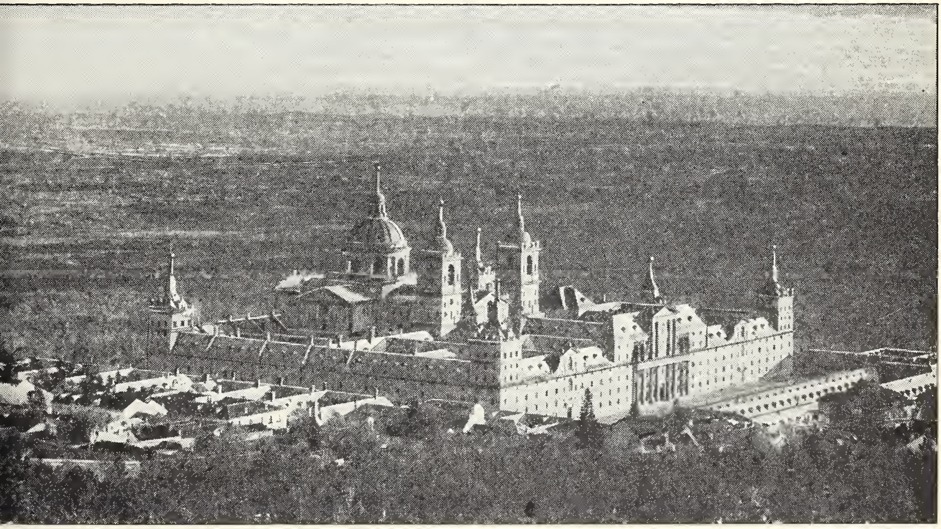


Fig. 107. The walled city of Carcassonne, France, famous as early as the twelfth century for its manufacture of woolen cloth. The castle and cathedral rise above the walls within the city



Ewing Galloway

Fig. 108. The Escorial, a monastery built by King Philip II of Spain in 1556. In it were the church, the palace, the library, and the burial place for the Spanish kings

At regular periods — sometimes once a year, sometimes more often — fairs were held in London. They were larger and had a greater variety of goods than the fairs of the villages and towns. Some, like those at Winchester, were really international centers of trade. Merchants with goods from the continent of Europe and even from distant Asia arranged to be there during fair-time. A great trade went on in wool and wine, spices, meats, fabrics, garments, and ornaments of many kinds.

So in the later Middle Ages towns were growing fast in England. London in 1327 had a population of 37,000; York, of 12,000; Bristol, of 10,000; Plymouth, of 8000; Coventry, of 8000; Norwich, of 6000; and Lincoln, of 5000. The English census of 1327 shows that there were 20 towns with over 3000 inhabitants.

2. Towns and Cities Were Developing in France

But in 1327 London, with its 37,000 inhabitants, was not the largest city in Europe. In France was Paris, a city of about 200,000 people, engaged in a large number of occupations.

As in London, a fair was held at Paris each year. This lasted for two months. Merchants banded themselves together in big companies and traveled to Paris with their wares. Because the roads were so rough, many of them came by water — on the rafts and barges which went up and down the rivers. In contrast to London, Paris traded little with foreign cities. Most of her trade was carried on with the many towns and farms along the rivers of France.

As the years passed, the city became the largest center of trade and handicrafts in Europe. By the late 1300's Paris had a population of about 300,000.

3. The Increase in Handicrafts and in Trade Brought About the Development of Cities in Italy

In Italy there were several cities which, because of their location on the Mediterranean Sea, had grown to be important seaports. There was Venice, for example, built on little islands at the mouth of the Po River on the Adriatic Sea. Venice was different from most towns. Instead of high walls, it depended on the sea for protection. Instead of rough and narrow streets through which the people walked, it had canals through which they traveled in small boats. The little islands were large enough for shops and houses but not for farms or gardens; so most of the people were fishermen, traders, or manufacturers.

As you read before, the merchants of the Italian cities carried on the trade with the Far East. It was they who built the ships for this trade. Even as early as 1100 the Venetians had a fleet of several thousand ships. With such a large number of vessels they were able to clear the Adriatic Sea and the Mediterranean of pirates and make them safe for travel. They built up trade with Europe as well as with the East.

One old record shows that in 1318 there arrived at the Belgian city of Bruges five Venetian ships filled with goods to be sold at the annual fair. They had carried silks and spices from India; cinnamon, sugar, and drugs from Morocco; pepper and spices from Egypt; furs and wax from Russia; and cloth of gold, silk, and furs from Tartary. For the return trip to Venice and the East the vessels were loaded with raw materials such as hides, tallow, salt, meat, fish, flax, timber, tin, and lead. The goods that had been manufactured by the craftsmen of western Europe were also in demand in Venice. Some were sold there; others were shipped on to the city of Alexandria, where merchants from Asia gathered to attend an annual fair. Later some of these things were transported overland even as far as India. Thus the Venetians purchased whole cargoes of raw materials from the ports of northern Europe and sold or exchanged these at ports in the Orient. From the Eastern ports they took back other cargoes of things which the peoples there had to sell.

4. The Towns of Germany

During these same years a number of German towns were also becoming rich and powerful because of the growth of crafts and trade. Nuremberg became famous for its clothmaking as well as for other crafts. Even as early as 1600 Augsburg was regarded as one of the most important towns of Germany. It had one street which was spoken of as the most splendid street of all Europe. The roofs of the houses were made of copper, and most of the houses themselves were built of stone.

There were other important towns in the north on the Baltic Sea and the North Sea. Among these were Hamburg, Bremen, and Lübeck. These German communities, like those in England and France or in Italy and Spain, were really fortresses. Each was surrounded by stone walls, with massive round or square towers rising above them at various places. Each could be entered only through great gateways, which were always closed at night.

The Handicrafts Developed with Trade

As trade increased, the people of Europe began to want more food, more clothes, more household furnishings, more luxuries of all kinds than they had known in the simpler days of the Middle Ages. It was natural, therefore, that craftsmen should begin to supply the greater needs by making many kinds of goods. Thus the towns became centers of industry as well as

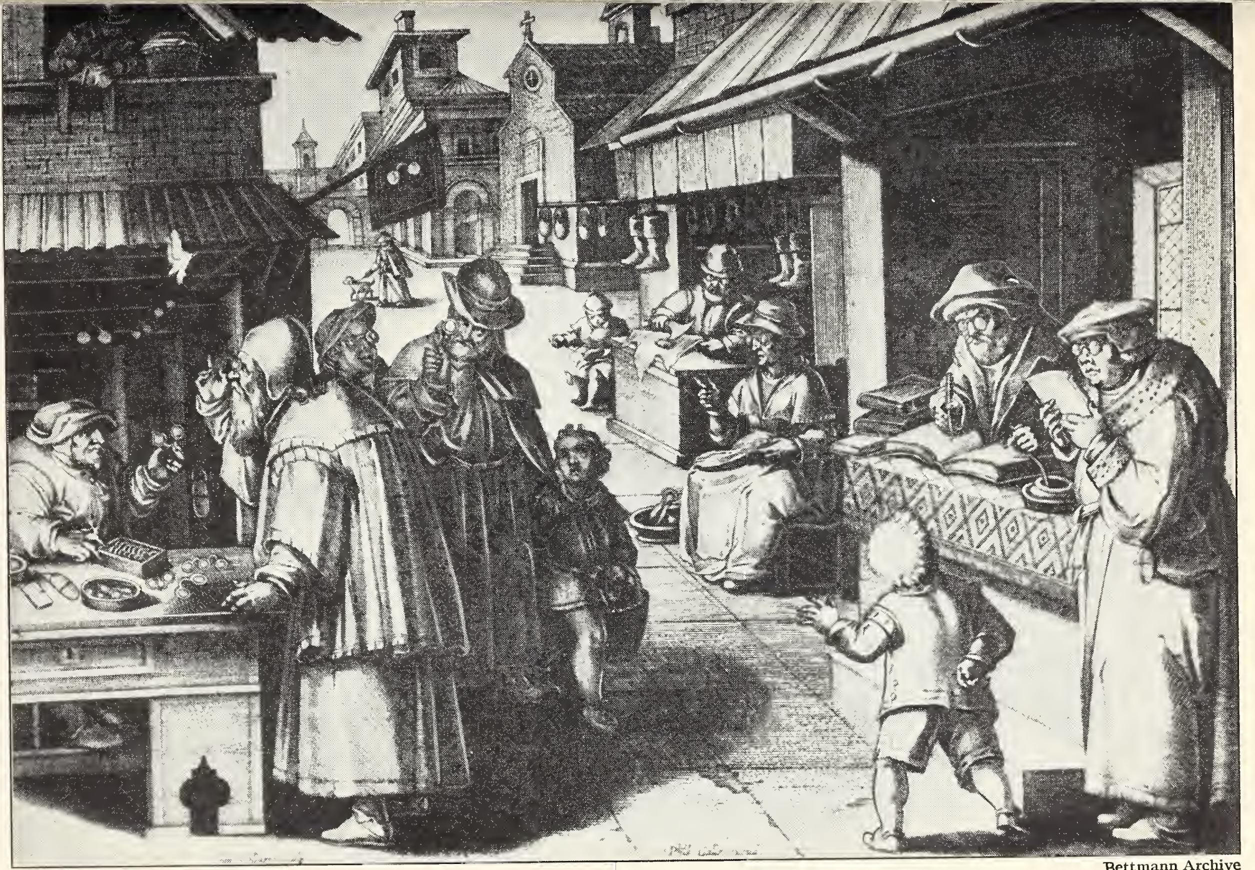


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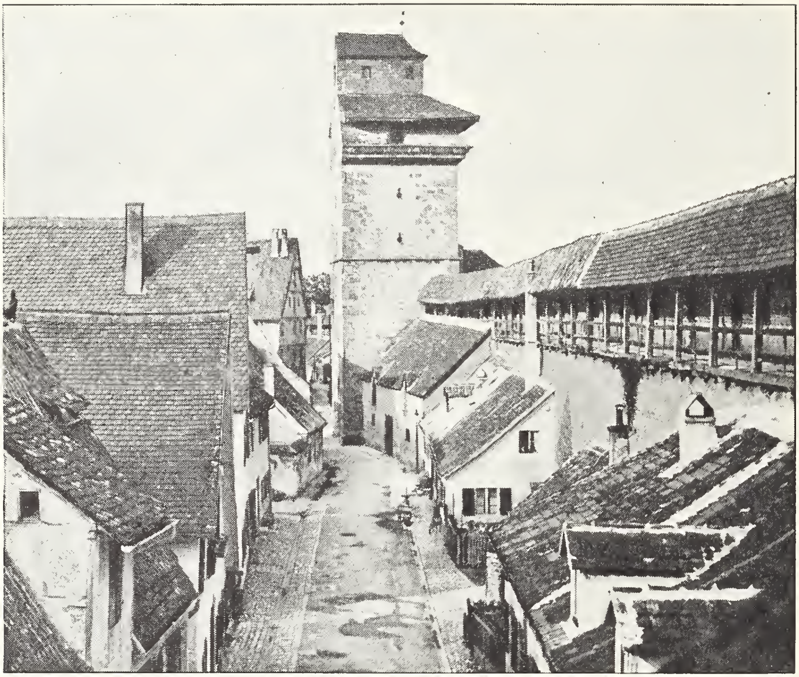
FIG. 109. Village trade in Europe of the early 1600's. The spectacle-maker seems especially busy



German Railroads

Fig. 110. Nördlingen, Germany, is one of the towns that grew during the Middle Ages. The walls were a necessary defense to the people

of trade. It was not the kind of industry we have today, that is, industry carried on in great factories by large numbers of men working at machines. It was, instead, handicraft industry. All the work was done by hand in small shops with a very small number of people at work. These included the master craftsman and perhaps one or two or three assistants. They might be apprentices, boys who were learning the craft from the master. Or they might be journeymen, men who had been apprentices but who had not yet set up a business for themselves.

In each town there were many kinds of craftsmen — bakers and cooks, soapmakers and blacksmiths, goldsmiths and tinsmiths, swordmakers and spurmakers, silk-spinners and wool-spinners, weavers, and any number of others.

Gradually the craftsmen in all these industries began to organize into guilds. Both masters and workmen belonged to the guilds. In this they were not like our trade unions, to which only workers are supposed to belong. The guilds made a number of rules for workers and masters to follow. Most important of all, they decided how expert the work of the craftsmen must be, and they set prices for goods. That there was need for such an organization to keep up the quality of the work (as even today) is shown by these words taken from a sermon of the times:

> The innkeepers and wine merchants secretly mix water with their wine, or bad wine with good. The innkeeper charges for a bad candle at six times its value and demands extra payment if you use his dice. Wretched old women water the milk . . . and try to make their cheeses look richer by soaking them in broth. Flax which is to be sold by weight is left out all night on the damp grass, so that it may be heavier. Butchers . . . before delivering a pig drain away its blood and use it to redden the gills of stale and discolored fish. The drapers . . . have one yard measure for selling and another for buying. They only display their goods in dark streets, so as to deceive the buyers as to its quality.[1]

The guilds became very important in the life of the Middle Ages, often taking a large part in the government of the cities. And as there were more craftsmen and more trade, the towns grew. As they grew, there was more demand both for products made at home and for products brought by traders from a distance. So industry and trade helped to make a new Europe.

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[1] Joan Evans, *Life in Mediaeval France*, p. 72. Oxford University Press, New York, 1925.

Serfdom Began to Disappear

Not only the town but the countryside began to change during these years. No more were the farmers tied to the lord and his manor as they once had been. Gradually they became freemen, who paid the landowners in money for the use of the land instead of being serfs who worked on the manor in the service of the lord.

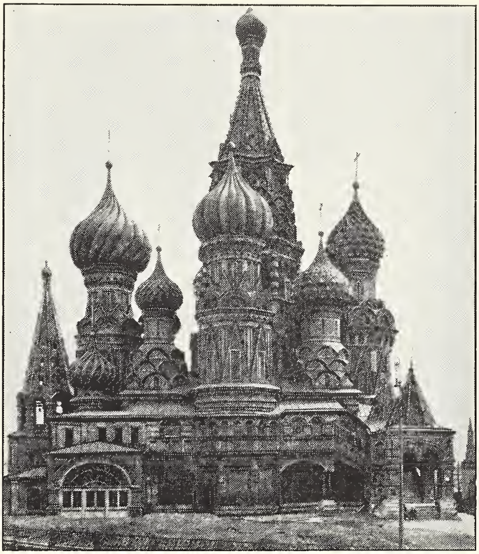
Many causes had worked together to bring about this change. The spirit of freedom which had sprung up in the towns naturally spread to the countryside and made the serfs dissatisfied with their way of life. Some of them fled to the cities and so gained their freedom. In England if an escaped serf lived in a town for a year and a day, he became a free man. No one could then force him to return to his former home.

During these years also the lords often found themselves in great need of money. In such cases, therefore, they permitted the serfs to buy their freedom. It seemed much better for them to receive money than services for the use of their land. As more and more serfs bought their freedom, the lords came to depend upon paid laborers to do the work upon the lands which they kept for themselves.

A terrible disaster also hastened the changes which were taking place in Europe. In the 1340's a disease known as the Black Death swept over Europe from the East, bringing misery and death in its path. In England over half the population died. These deaths greatly reduced the number of serfs and free laborers. Everywhere there were fields to be cultivated and flocks and herds to be cared for. Naturally the landowning lords could find few laborers to do their work, and those who did remain were able to demand higher wages and more freedom.

We find at this time that the English Parliament began to pass laws forcing the laborers to work for certain wages and to stay in one place. These laws could not be entirely enforced, and the struggle between landowners and laborers continued. In 1377 the peasants rose against the lords and their laws, as well as against a war tax which was put on by the government. A real revolt broke out. Thousands of peasants marched into London.

Even the king was at their mercy. He said to the peasants: "I am your king and lord, good people. What will ye?"



De Cou from Ewing Galloway

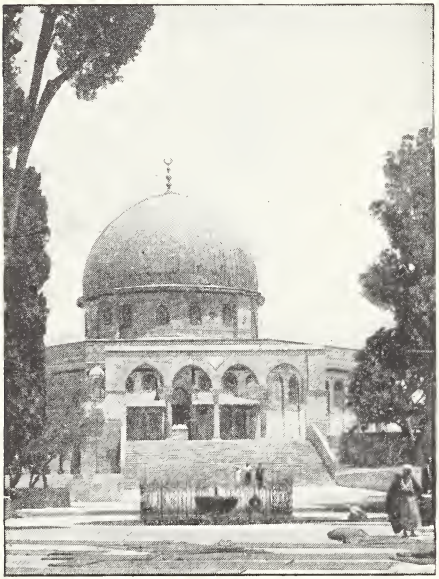
FIG. 111. The Cathedral of Saint Basil, built in Moscow, Russia, by Tsar Ivan the Terrible in 1554. What type of architecture influenced the building of this cathedral?

"We will that you free us forever, us and our lands; and that we be never named nor held for serfs," they answered.

"I grant it," replied the king.

But Wat Tyler, the peasants' ablest leader, was killed in a scuffle. After that, although the peasants held out in some places, the armies of the nobles were victorious. Finally the revolt was crushed. Then the king's promise was not carried out. The peasants seemed to have failed, but other things which were working toward the freedom of the serfs went on happening.

It was at this time that the landlords themselves hastened the change which was to come. They found that with the growth of the woolen industry, there was more and more demand for wool. Why should they not turn the fields for which they had so much trouble finding laborers into grazing lands for flocks of sheep? The plan was tried out all over the country and soon became very popular. Much of the land that had once been cultivated was enclosed for sheep pastures. For this reason the plan is called the enclosure movement.



Ewing Galloway

Fig. 112. The Church of the Dome of the Rock in Palestine. Notice the use of the dome and the arch in this Eastern architecture of the Middle Ages

As you can understand, it takes far fewer laborers to care for sheep than it does to cultivate fields, so there came to be less and less demand for farm laborers. Indeed, many of the peasants who had remained on the land were forced off. They gained their freedom, of course, but all too often they could do nothing with it. In time they drifted to the towns, where they increased the number of town workers, who were now beginning to make possible the new industries of the country.

We have told briefly the story of what happened in England; for England was the first country to make these and many other changes which will be described later. However, the same kinds of happenings were going on in different ways all over Europe. Serfdom was slowly disappearing over the western part of the continent.

The "Renaissance," or "New Birth," of Civilization

We have seen how there was an increase of trade, growing towns and cities, and an increase of industry in Europe during the late Middle Ages. But, as you know, civilization is more than trade; it is more than towns and cities; it is more than industry. These alone do not make up a great civilization like that of Egypt or Babylon or Crete or Greece or Rome. They play their part, but they are not the whole story.

Just as important, and perhaps more so, is the part played by artists and scientists and writers and other great thinkers. And such men did appear in Europe at this time. In fact, there began a period of such great advance in these fields that the years between the Middle Ages and modern times have become known as the Renaissance, which means "new birth."

The Renaissance began in the cities of Italy, particularly in Venice and Florence. As the people came in contact with the civilizations of the eastern countries, they lost many of the superstitious beliefs of the early Middle Ages. They learned something of the wisdom of the older and more advanced lands. Students again became interested in the learning of Greece and Rome, and out of this study of ancient knowledge came a new art and architecture and literature.

In the 1300's two poets, Dante and Petrarch, created works of lasting greatness. Boccaccio, an author of stories, wrote what is thought by some to be the most perfect Italian prose ever written.

In the 1400's Florence was the most cultured city in Europe. It had magnificent buildings and beautiful works of art. Nearly all the best European artists and architects of that day did their part to add to its glory. During the late 1400's and early 1500's lived three artists of great genius — Leonardo da Vinci, Michelangelo, and Raphael.

Interest in learning and art then moved northward. In Germany and the Netherlands appeared artists who were rivals of the Italians. In France during the 1500's were several great writers. And all the northern lands had their scholars, artists, and other great thinkers.

Books You Would Like To Read

Avebury, John L. A Short History of Coins and Currency. John Murray, London.

Carter, Mary D. The Story of Money. Farrar & Rinehart, Inc., New York.

Hewes, Agnes Danforth. A Boy of the Lost Crusade. Houghton Mifflin Company, Boston.

Hewes, Agnes Danforth. Spice and the Devil's Cave. Alfred A. Knopf, Inc., New York.

Kent, Louise Andrews. He Went with Marco Polo. Houghton Mifflin Company, Boston.

Lamprey, Louise. In the Days of the Guild. Frederick A. Stokes Company, New York.

Lamprey, Louise. Masters of the Guild. Frederick A. Stokes Company, New York.

MacGregor, Mary. Story of France. Frederick A. Stokes Company, New York.

Power, E. E., and Power, R. D. Cities and Their Stories (school edition). Houghton Mifflin Company, Boston.

Quennell, Marjorie and C. H. B. A History of Everyday Things in England. Charles Scribner's Sons, New York.

Seaman, Augusta H. Jacqueline of the Carrier Pigeons. The Macmillan Company, New York.

Tappan, E. M. Old World Hero Stories. Houghton Mifflin Company, Boston.

CHAPTER XX

Inventors and Scientists Build European Civilization: 1000–1750 A.D.

Man Is Always Inventing

WE HAVE seen in every chapter that mankind throughout the ages has been inventing . . . inventing . . . inventing! Indeed, the very story of civilization is the story of invention.

Our ancestors, the Stone Age people, gave up their wandering life of food-gathering, learned to cultivate seeds, and settled down to live in one place. They invented permanent houses, as well as tools and implements for farming and building.

The New Stone Age men of Egypt advanced civilization by improving on the earlier inventions and making many new ones. They invented tools and implements to irrigate the land, ways of telling time and ways of measuring and counting, as well as various kinds of writing.

By inventing the alphabet from the earlier writing of the Egyptians, the Seirites started a new idea that was to pass on round the Western world and finally lead to the millions of books, magazines, and other printed things of today.

The Hindus of India and the Arabs of Mesopotamia, working together, gave us our system of counting in arithmetic and algebra and trigonometry. The Greeks improved on their work and added geometry to the sciences.

These and other peoples helped to invent the arts and crafts. The Egyptians, Mesopotamians, and Cretans had fine examples of building. But perhaps the best architects among all the ancients were the Greeks. After them the Romans invented concrete and used it in putting up their buildings. They took the ideas of the dome and the arch, which had come from the East, and used them in their public buildings, their huge bridges and walls.

Beautiful poetry, music, dancing, and acting were created by all the ancient peoples. The arts of painting and sculpture had been developed in each of the river-valley civilizations, and especially in Greece.

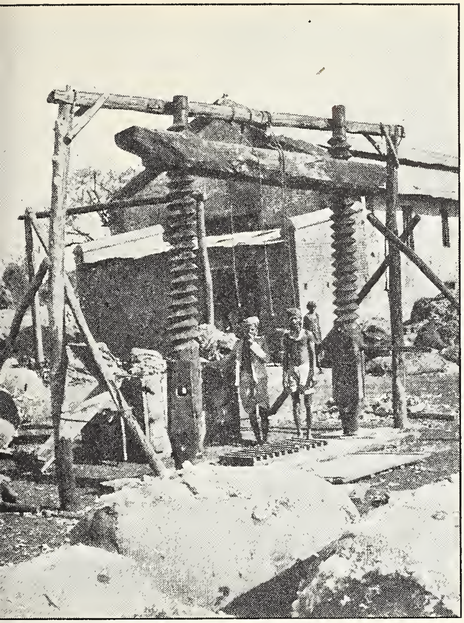
These are only a few examples of the ways in which man was inventing . . . inventing . . . inventing . . . as he advanced his civilizations on earth. They are enough to show us that the story of civilization is largely the story of invention.

And now, with the Dark Ages passing in Europe, a period of numberless wonderful inventions was to begin, a period which has extended clear down to the present day. No other period in man's history can compare with it. In the years that have passed since about 1000 A.D. man has made more inventions than in all the millions of years before that time.

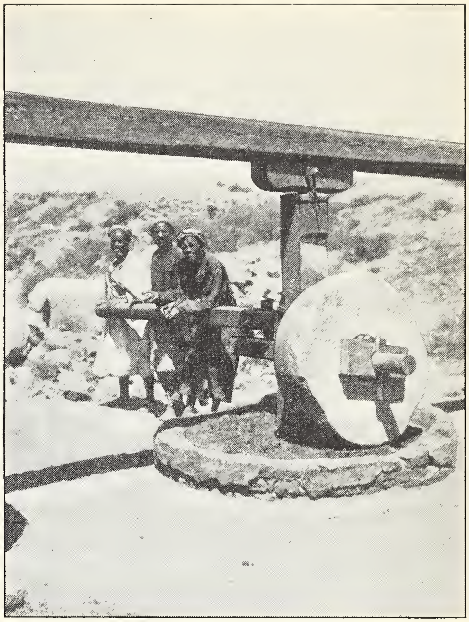
Better Power Aids

The stories you have read show very clearly that most of the work of the Europeans of the Middle Ages was done by hand. There were no machines or engines as we know them today. All goods were handmade. Each piece was pounded or shaped, cut or sawed or planed, sewed or fastened — by hand. The same was true of most of the work on the farms; the seeding, cultivating, and harvesting were all done by hand.

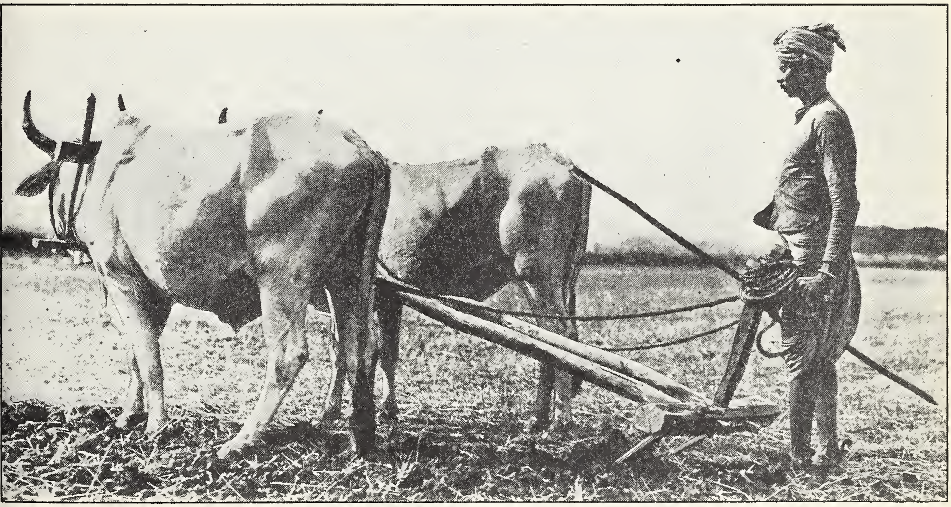
Many of these tasks, especially the careful handwork done in the shops of the towns, did not require much power. Skill was the important requirement in this kind of work. But to



A wooden cotton press of Central India



A stone-crusher in use in Egypt today



Ewing Galloway

Preparing the land for planting wheat in India

FIG. 113. For thousands of years wood and stone were the materials out of which man built his power aids

irrigate fields in dry lands or seasons, enormous amounts of water had to be lifted from the streams. Great power was needed to pull the plows through the ground and to bring coal and metals from below the surface of the earth. To pull boats through the water or vehicles over roads required power.

Even as late as 1000, man had learned little about increasing his power. He still depended largely on his own muscles or on the muscles of animals. And even in the use of these he was very unskillful. About this time, however, he finally began to invent better power aids to help him to do his work.[1]

Horseshoes and Harnesses

"Believe it or not," the story of better power aids in Europe begins with horseshoes and harnesses.

For no one knows how long, man had tamed horses and other animals and made them do his work. But, astonishing though it may seem, these peoples did not invent horseshoes or really good harnesses.

"Horseshoes! What had they to do with 'power'?" you are asking. Very much indeed. Because a horse's hoof is smooth, it cannot get a good hold on the ground. Imagine for a moment how difficult it would be for you to pull a heavy cart while walking in your bare feet. But in strong, heavy shoes you can get a firm grip on the ground and pull much more surely. So it is with horses.

Can you see, then, what an important invention it was when some intelligent farmer or blacksmith got the idea of nailing iron shoes to a horse's hoofs? Who did it first, we do not know. Probably many different peoples did at different times. Knowing that it did not hurt the horse, they tried it

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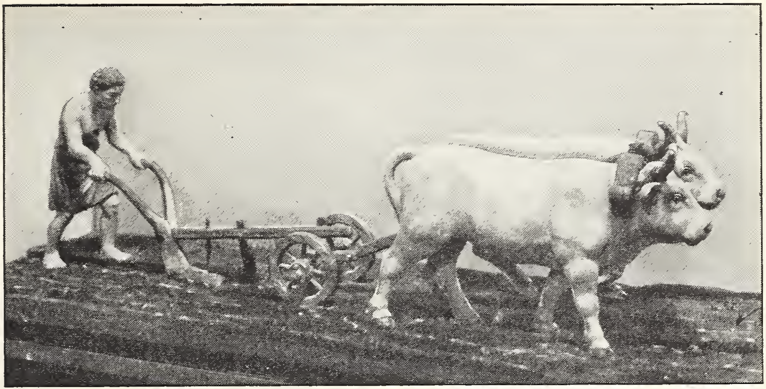
[1] If you reread Part V, "Man the Power-Maker," in *Man at Work: His Industries*, you will recall the story of power inventions.



New York Museum of Science and Industry

Fig. 114. Even as late as 1000 a.d. plowing had not improved much beyond this early Roman way

and found that with shoes on he could grip the ground better and pull harder. It is known that by about 900 a.d. iron horseshoes were being used in different parts of Europe.

Shortly afterward harness-makers began to design and make a modern harness (certainly the people of those days called it modern). For 1000 years and more the Romans and other peoples around the Mediterranean Sea had harnessed horses to wagons. But all that time the leather straps with which the pulling was done went around the horse's neck and shut off his breathing if the load was heavy. The neck was really a weak spot in the horse's body. The back and shoulders are much stronger for pulling.

In the 900's one or more Europeans did discover how to make a harness that would fit around the horse's shoulders. If you go out on the street and examine the harness on a horse you will see how much pulling power it gives him. (We hope that horses haven't entirely disappeared from your streets!)

Do you see, then, that horseshoes and shoulder harnesses were two important power-aid inventions of the Middle Ages? After 1000 the number of horses used in Europe in all kinds of work increased greatly. They were used not only in plowing and cultivating the fields but in transporting people and things on the roads. Because of this increased use, better farming could be done. Old roads and vehicles were improved, and new ones began to appear.

Later, treadmills were invented. Do you know what a treadmill is? It consists of a wheel or slanting platform which is put into motion as men or animals take steps on it. One is shown in figure 59. Treadmills gradually came into use, and walking or running horses kept them in motion. They were attached to the miller's grinding stone, and his grain was ground for him. They turned the wheels of the pumps and lifted water out of coal and iron mines.

One invention helped to bring about another. Improvements in one way of living helped to bring improvements in other ways. Slowly the way was being prepared for the invention of real machines.

Using the Windmill To Build Better Civilization

Another idea which helped to bring about new inventions was that there is power in the wind.[1] We can find no record of the invention of windmills until just after 1100. It is believed that there was one in France in 1105 and one in England in 1143. We are told of Dean Herbert and other landowners in England using windmills to grind grain in the late 1100's. In the 1200's and 1300's they were widely used to do heavy kinds of work.

Thousands of windmills were used all over Holland as early as the 1300's. A single one was said to make from five

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[1] See, once more, Chapter X of *Man at Work: His Industries.*

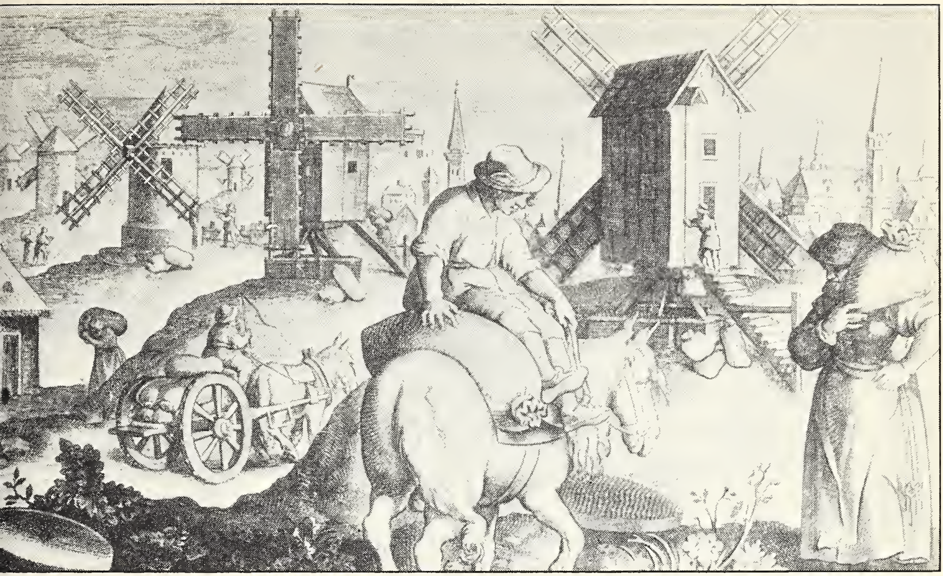

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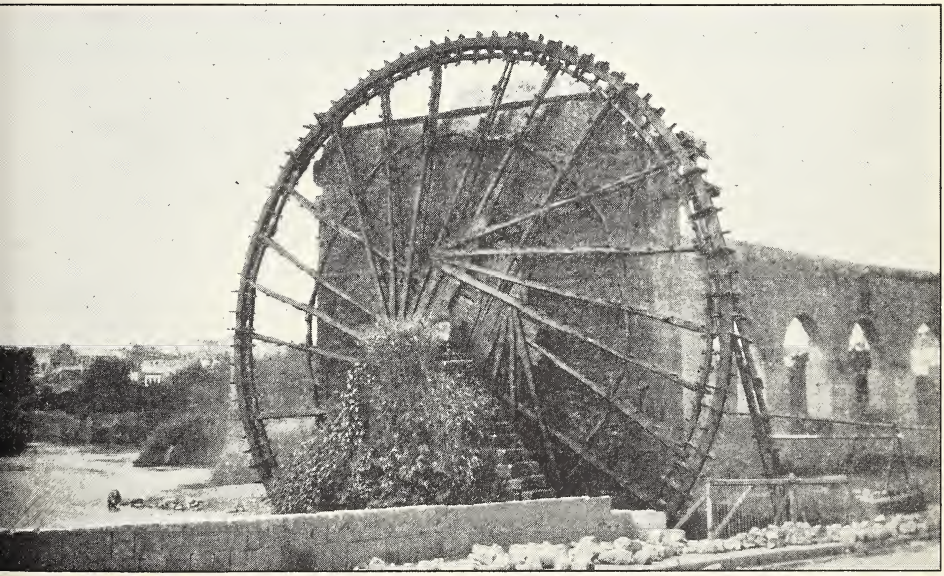
FIG. 115. In Europe during the Middle Ages windmills like these furnished the power for grinding the grain of the peasants



Ewing Galloway

FIG. 116. Water coming from near-by hills along the aqueduct provides the power to turn this wheel in Hama, Syria

to ten "horsepower"; this meant that it could do as much work in a minute or an hour as from five to ten horses. And, of course, it could keep moving twenty-four hours a day, if the wind blew that long! A horse could work how many? Certainly not more than ten or twelve hours, and it is doubtful if he could keep going that long.

Some of the windmills, then, ground grain, pumped water, and did other farm work. In Holland most of them were used to drain the sea water from the land. The lands near the coast are so low that many square miles are actually lower than the sea. You can see why for hundreds of years this region has been called the Netherlands, which means the "Low Countries." After about 1000 the people of the Low Countries built dikes (walls) to keep the sea off their lands. Little by little they drained the water out into canals, so that the soil could be used for farming. The windmill was the power-maker which made this possible.

Not only in Holland, but in France, in Germany, in England, in Italy, — in fact, all over civilized Europe, — the people were harnessing the winds to do their work. In the 1000's, 1100's, 1200's, 1300's, and later, this power of doing work increased. And, as this happened, ways of living improved.

Water Wheels To Do Man's Work

Just as with wind, so with moving water: "there's power in it!" All one has to do to get it to do work is to harness it.

The water wheel (figure 116) was man's invention to harness the power in moving water. It is said that the Romans and possibly peoples before them had this idea.

As the Roman Empire spread into western Europe the water wheel went with it. In 1100 one count showed 5000 water mills in the little country of England. Imagine, then, how widely they must have been used on the European continent, where ways of living were even more advanced!

Water wheels began to do many kinds of heavy work. In Germany, about 1300, they gave the power for the paper mills, they sawed timber, and they ran ironworks. They ran silk-spinning frames in Italy, beat animal skins in tanneries in Switzerland, and turned the grindstones of steel-weapon-makers in Spain. In 1400 the ruler of Nuremberg, Germany, ran a wire-pulling factory with water power. The underground machinery of iron mines was run by water wheels. Ore was crushed and bellows were blown by the same power.

As with windmills, water wheels could work 24 hours a day if the water kept moving. Moreover, water was more regular than wind, and the wheels could make even more power than the windmills. One wheel in Italy, which was 76 feet in diameter, made 30 horsepower in a day — as much as 300 men!

Thus you have seen that after the 1000's the Europeans had begun to harness the "natural" powers to do their work.

Human muscles and animal muscles are natural power.

Moving wind and moving water are natural power. These natural powers were no good to man until they had been harnessed to a tool or a machine. "Let the wind blow all day! What does it matter, unless you can use it in some way to do your work."

"Let the waters rush down the valleys and drop over the falls! What does it matter, unless the force in the moving water can be harnessed — just as the power in horses' muscles had been harnessed — to do work for man."

What great gains the Europeans made in building their new civilization with these harnessed natural powers we shall see as we continue.

THE "AGE OF WOOD" IN EUROPE: 1000–1750

Today, in every city and town and most villages, our whole life depends on steel. We live in an Age of Steel.

Not so with the European peoples who turned the Middle Ages into modern times. Theirs, for 1000 years and more, was the Age of Wood. Almost everything they had was made of wood.

Houses of wood. There were only a few castles of the rich and the public buildings of the towns which were made of stone. Even in the latter, wooden frameworks had to be used. Beams and rafters, columns, furniture, and even nails were of wood.

Wooden tools on the farm — rakes and hoes, plows, flails, sickles and scythes, and yokes.

Wooden tools and implements and machines in the towns — looms and lathes and spinning wheels, buckets and tubs. Pipes and troughs were made of hollowed logs. Wagons and carts and wheels, parts of pumps, water wheels and windmills, all of wood. And even boilers of steam engines were wooden barrels! When printing presses were made after 1400, wood was the material used.

Boats and ships — long straight tree trunks for masts and spars. Wood for canal boats, wood for rowboats, long planks for ocean-going ships.

Fuel — burning wood to keep people warm, burning wood in the furnaces of the glassblowers and the ironworkers.

Wood . . . wood . . . wood! Everybody wanted wood for one purpose or another. As populations grew, as cities grew, as merchant fleets grew, as windmills and water wheels, factories, and tools increased in numbers, and as everything else man used multiplied, the uses of wood multiplied too.

The Europeans, Like All Other Peoples, Wasted Wood

Fast and faster the forests were chopped down. Slowly, very slowly, new trees grew in their places. It took from 30 to 50 years for a big tree to grow, but it took only a few minutes to cut it down. On every hand trees were wasted. They had been wasted in Greece and Rome, in China and in Asia Minor. So, they were wasted in the new and changing Europe. Waste! Waste! Waste!

Inventing the Idea of Conservation of Nature's Gifts

Is it any wonder, then, that by 1600 Queen Elizabeth of England and the rulers of other countries had to make laws forbidding the use of wood for certain purposes. Slowly the new Europeans learned that they must conserve their forests; that is, use them wisely and savingly, plant many more trees each year than they cut down.

One by one the separate peoples of Europe — the French, the English, the Spaniards, and others — slowly learned that they had to conserve their forests. They learned that they had to conserve their soil. And they learned — very much later — that they had to conserve their coal. They learned to drain their marshlands of water and otherwise to get back the use of their spoiled lands.

This idea of conservation of nature's gifts was perhaps one of the most important advances of all those years.

METALS AND THE BLAST FURNACE

Does all this talk about the Age of Wood mean that people used no metal in Europe during all this time?

No, indeed. You know, of course, that the cutting edges of tools and implements and weapons were made of iron, sometimes even of fine, hand-hammered steel. Some pots and other utensils were likewise made of iron. The hubs of wheels and sometimes the rims were of metal. And, as we have read, horses were being shod with iron shoes. But the uses of iron were few, even as late as 1600.

You remember that iron was smelted and used by the Hittites of Asia Minor and other peoples of the eastern Mediterranean 1000 years before Christ. From that time on, small furnaces were always in use to separate iron from the ore. There was also a smithy in which the hot metal was hammered into parts. These "blast furnaces" themselves were very crude. Ten pounds of iron was about all that two men could smelt and hammer out in a hard day's work! That is, perhaps, the way people smelted iron 2000 to 3000 years ago.

About 1000 a new blast furnace could be seen in Catalonia, a province of Spain. That province is famous in history because of the fine iron that was smelted in its remarkable furnaces. This blast furnace was built of well-laid bricks or stones. At one side was a large bellows through which a man could pump air into the fire. Inside the furnace, layers of charcoal were burned with layers of iron ore between them. The intense heat of the fire melted the ore, and the iron ran to the bottom in a lump. Through a long hole the iron was drawn out of the side of the furnace and hammered into shape on an anvil. Was the Catalan forge an improvement over the furnaces used 2000 years earlier? Yes, the Catalan blast furnace made 2000 pounds (a ton) of iron a day, using the labor of several workmen.

So it was that the Moorish and other ironworkers slowly taught the newer European peoples the art of ironmaking. But slowly, indeed; for the Catalan furnace was about the best there was until nearly 1600.

INVENTIONS IN GLASS HELPED TO CHANGE CIVILIZATION

Perhaps you are thinking that the Europeans invented very little for themselves in these centuries at the end of the Middle Ages? If you are, you are quite correct. In the period from 1000 to about 1500 the Europeans were really learning how to use things that had been made long, long before, or thinking up improvements on them, or finding new uses for them.

That was what happened in the case of glass. Perhaps nothing was more important in changing the lives of the European peoples than glass. Yet little really new was done with it until about 1500. At that time came changes, indeed!

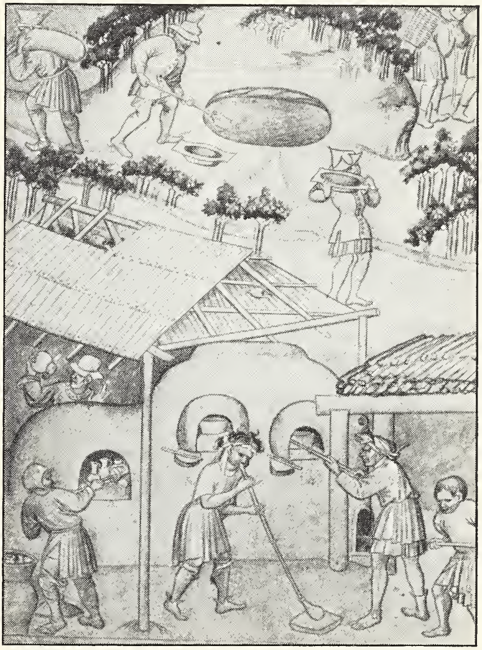


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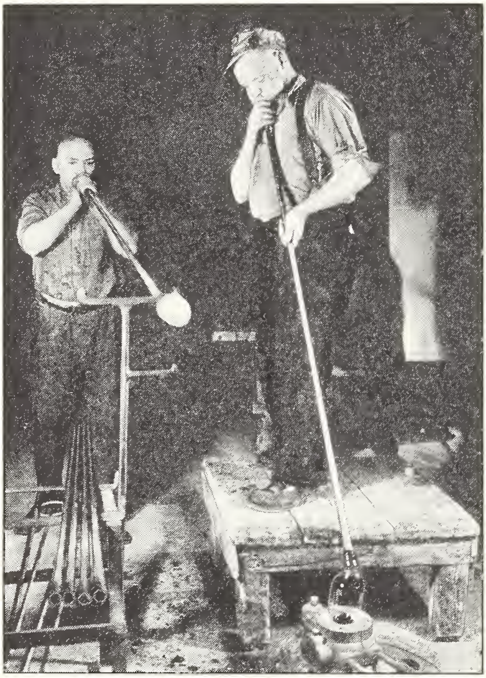
FIG. 117. An early fifteenth-century painting showing the steps in the making of glass in Flanders. Can you name them?

What Is Glass?

It is interesting to know that nature did not provide man with glass; he had to invent it. He took certain materials, mixed them together, heated and cooled them in certain ways, and they became glass.

In making glass today expert chemists carefully measure the materials. First they take sand. Usually the sand contains impurities, and these must be removed. For example, if even a tiny bit of iron stays in the sand, the glass will not be colorless. So the iron and other impurities are removed, first, by putting the sand through water; then, by burning it over flames; and, finally, by sifting it through copper gauze. Next a certain amount of lime or lead is added. This gives the glass a fine luster and makes it almost perfectly transparent. Then sometimes other materials are added. The whole mixture is called a "batch."



Ewing Galloway

Fig. 118. Glassblowing at the Corning glass-works today

The batch is put into a furnace, where the materials are melted. The heat used reaches from 1832° F. to 2730° F.! At the proper moment the liquid glass is drawn out from one end.

Let us suppose that window glass is being made. The hot liquid flows from the furnace over rollers which are run by electricity, and is formed into long, flat sheets. As the sheets come from the rollers they are cut into the sizes for windows.

Articles of various shapes are formed in several ways. Some are blown as is shown in figure 118. Table glassware is usually made by pressing.

There are many kinds of glass in use in the world today. In our own country it can be said that not only do we live in an Age of Steel; we also live in an Age of Glass.

How Old Is Glass?

When did man learn to make this marvelous thing? Long, long ago. It was so long ago that we know very little about its beginnings. The Egyptians used small beads of glass as long ago as 4000 B.C. These were not blown or rolled or pressed or cut. It is more than likely that someone (or many someones) noticed that a certain heating of mixtures of sand and lime and potash in fires made a paste which was transparent when cooled. This happened many times, perhaps, until inventive people began to notice how the mass was formed. Then they began to mix these materials to make whatever kind of glass they wished. Some Egyptian paintings, dated about 2700 B.C., show glassblowers actually at work. Thus we can be sure that at least 4600 years ago the art of blowing glass was known.

The Mesopotamian peoples learned the art and improved on it. The Persians and, after them, the Greeks — especially those at Alexandria in Egypt — became famous for their beautiful glassware.

After the time of Christ, especially, the art of glassmaking spread from Alexandria to Rome. It is certain that the houses of the well-to-do in Pompeii, near Naples, had clear glass windows about 50 years before Christ. Slowly the secrets were carried to different parts of the Roman Empire. Many kinds of glass have been found in France, in Germany, and in Britain, as well as all around the Mediterranean itself.

The Mohammedans of the Near East used glass in many ways. In Constantinople and the Eastern Roman Empire were special shops where it was made. It seems to be true, however, that for the centuries from 500 to 1100 or 1200, the craftsmen did not have as much skill in glassmaking as those of ancient times.

But by 1300 glassmaking had become one of the most advanced crafts in Europe, especially in the rich trading cities of Italy. On one special island of Venice, called Murano, the craftsmen were organized into four guilds. One group made glass for windows and containers for liquids and foods, dishes for cooking, and the like. Another made mirrors. A third made lenses for various uses. The fourth made beads.

So important did these skilled workmen become in the life of the European cities that, even before 1400, laws were passed permitting their children to marry into noble families. In England only noblemen were granted permission to engage in the manufacturing of glass.

The 200 years from 1300 to 1500 saw a remarkable growth in the glass industry. During the same period also glass was put to many different uses. It is these new uses for glass that we should remember especially.

HOW GLASS CHANGED LIVING IN EUROPE

1. Glass for Windows and for Hothouses

For centuries during the Middle Ages most houses of Europe had been dark. Windows, when screened at all, were covered by muslin or oiled paper — not a very good means of letting in light or letting the people inside look out. Then came the rediscovery of plate glass, and slowly wealthy people began to use it in the windows of their houses. For a long time it was so expensive that people took the panes out of their windows and locked them in safe places when they went away on trips! Gradually glass became cheaper and more widely used. By 1450 half the houses of the larger cities of Europe had windows of glass. Then sunlight came streaming into houses, lighting them and revealing the dirt that could not be seen in the dark. People began to keep their houses cleaner, and as this happened, their health improved. A new feeling of not being shut in also spread abroad.

Glass windows brought interesting changes in agriculture also. The first of these was in European "hothouses," in which flowers (and perhaps vegetables as well) were grown. We know that there were hothouses in France as early as 1385.

2. The Lens Rediscovered: Eyesight and Spectacles

Perhaps even more important than the glass window was the glass lens.

A lens is a transparent piece of glass having at least one curved surface. There are two main kinds of surface — convex and concave — and several other combinations of surface. Both are used in the making of spectacles, or eyeglasses.

One of the authors of this book began to wear glasses at the age of twelve years. He has never forgotten the astonishment he felt when he walked out in the street wearing his first pair. For the first time in his life he could see across the street and recognize who people were. Without knowing it, he had been very "nearsighted." The glasses before his eyes had lenses that changed the position and direction of the rays of light so that he could see clearly at a distance.

Now the idea of the lens had also been known for a very long time. The Roman writers speak of lenses being used as "burning glasses." You can experiment with such a burning glass by focusing the sun's rays on cloth or sawdust until it catches fire. The ancients also knew that a glass bowl filled with water would magnify small objects, but it is doubtful if they used lenses in spectacles.

Some students believe that Roger Bacon, a famous scientist, invented spectacles with glass lenses as early as 1215. At any rate, he is regarded as one of the first workers in this new science. Old records of the late 1200's speak frequently of people in Italy, France, Germany, and other parts of Europe wearing glasses for reading or writing. These glasses were very heavy, awkward things; we would laugh at them today. But certainly by the 1300's, and increasingly in the 1400's, the trade of the spectacle-maker had become one of importance.

So it was that the lens opened a new world of sight to millions of people. Today tens of millions of people on the earth are happier and healthier because they wear glasses.

3. The Glass Lens: The Telescope and Science of Astronomy

But the lens was to have other equally important uses!

One of these was the discovery of how to use the lens in the telescope and the microscope. These discoveries came at just about the same time — about 1600.

You know already the story of how Hans Lippershey, the Dutch spectacle-maker, got the idea of making a telescope from his children, who were playing in the street before his shop.[1] That was in the year 1608.

Shortly afterward, Galileo, the famous Italian scientist, heard of Lippershey's telescope. From it he got an idea: "A telescope will let me see the moon and stars much more clearly than with the naked eye!" He rushed home to his shop, and in a day's time had made a telescope. That night he tried it. Yes, there were the heavenly bodies, magnified many times.

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[1] You can read it again in Chapter V of *The First Book of the Earth.*

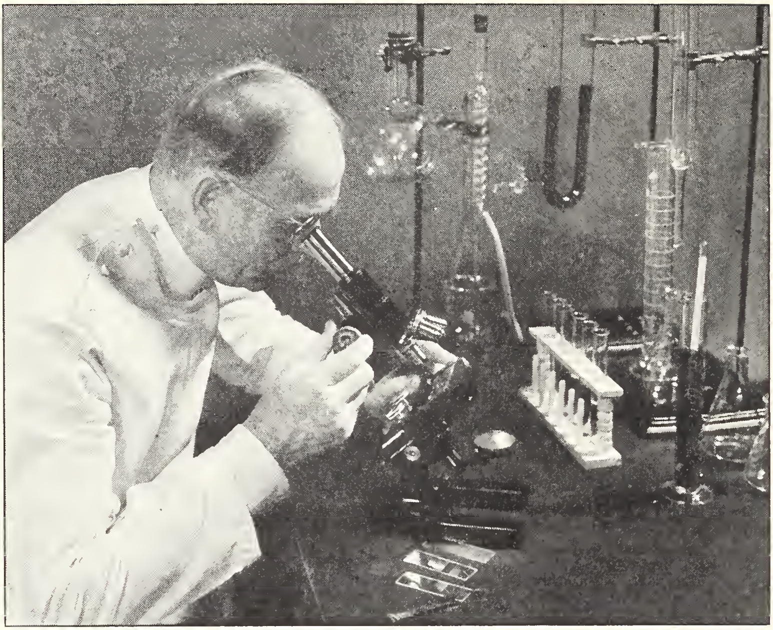
During the next year Galileo made many lenses and tubes. Finally he succeeded in making a telescope which would magnify a star 133 times as large as he could see it with his eye alone. With this telescope he discovered in the heavens new bodies of which people before that time had known nothing.

After Galileo's time glassmakers improved the lenses. And as they became bigger and stronger the heavens came closer and closer to people on the earth. More and more things were learned about the stars. Recently a lens 200 inches in diameter (17 feet!) was successfully made in America and will shortly be put into an enormous telescope. Think how much that great "glass" will magnify the heavens!

Do you see, then, that the Europeans' rediscovery of how to make glass helped to develop a new science? We call the science of studying the heavenly bodies astronomy. Long before Galileo's time people had looked at the heavens and worked out ideas as best they could about the bodies moving in space; but, lacking instruments with which to observe and measure things, they could not be accurate. You can see how the telescope-makers helped them. Later, as you study more of the sciences, such names as Copernicus (1473–1543), Tycho Brahe (1546–1601), Galileo (1564–1642), and Isaac Newton (1642–1727) will mean much to you. For the present it is enough to remember that as the Middle Ages slowly passed, the new science of astronomy spread all over Europe.

4. The Glass Lens: The Microscope and Other Sciences

The microscope, like the telescope, was made possible because of the invention of glass for lenses. As you know, the microscope magnifies very small things that are near at hand (figure 119). If you have ever played with a small magnifying glass, you have seen the idea at work.



Ewing Galloway

Fig. 119. A scientist today discovering with a microscope what cannot be seen with the naked eye

Pieces of convex lens made of quartz have been found even in the ruins of ancient Nineveh, showing that the magnifying glass was known there. But the first real microscope described in printed records was made by the Dutch spectacle-maker Zacharias Jansen in 1590. That was a huge, awkward instrument six feet in diameter. It is certain, therefore, that microscopes were in use in the 1500's.

In the 1600's Robert Hook, an English scientist, and Anton van Leeuwenhoek, a Dutch naturalist, greatly improved the microscope. Leeuwenhoek (1632–1723) is said to have made nearly 250 different ones. With these instruments, which could magnify a thing 100 times, scientists could examine the animal and plant world of tiny things. For example, scientists learned of the movement of the blood through the veins and arteries, of the way the bones and tissues of the body were made up, of tiny things in the body that caused disease, and many others.

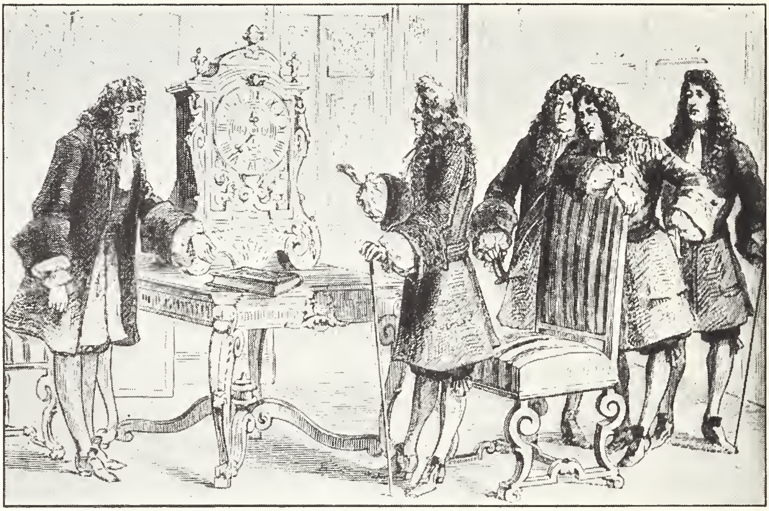
So it was that certain kinds of lenses, put into instruments called microscopes, helped to build up still newer sciences. Anatomy, bacteriology, and medicine were added to man's knowledge about himself and the world around him.

5. The Glass Lens and the Mirror

There are other important things in the story of glass, of which we can tell only a little. For example, imagine what a change occurred in dress and fashions, in hair-arrangements, in cleanliness, and the like when the mirror was invented! Of course the Romans and other ancients had had polished metal surfaces that they used to reflect images of themselves. And nature peoples had always been able to see themselves in clear pools of water. But by the 1500's silver and other coatings were put on clear polished glass to make perfect mirrors. Then it was that the noblemen of the cities all over Europe built rooms and rooms of mirrors into their great houses.

No doubt you can find more ways in which glass mirrors changed ways of living in Europe during modern times.

In this brief sketch we have merely hinted at the great part played by the invention of glass. It is enough to see, however, some of the important ways in which glass and invention brought about the new European civilization.



Bettmann Archive

Fig. 120. Huygens was the first to make a clock using the pendulum as the regulator. Here he is explaining it to the French king

THE INVENTION OF THE MECHANICAL CLOCK REGULATED PEOPLE'S LIVES

Much of the story of early timekeepers was told in *Man at Work: His Arts and Crafts*, so it would be wise for you at this time to go back to reread it.

By the early 1300's there were many kinds of elaborate timekeepers in Europe, but historians are not sure that any one of them was really a mechanical clock. For example, there was an extremely interesting clock invented in 1335 by Peter Lightfoot, a monk. On the hour full-armed iron horsemen rushed out of two gates and struck each other's lances. Every fifteen minutes another figure kicked two bells placed beneath his feet; on the hour he hit a larger bell with a battleax. In another place two knights in armor struck two other bells.

Although it is not known definitely who was the first to invent the mechanical clock, it is certain that about the year 1360 a clock driven by machinery was actually in use. This had been made by Henri de Vick of Württemberg, Germany. He used a 500-pound weight to make the power needed, and every time the weight dropped, all the parts — a drum, notched wheels, rods, the pointer, etc. — were put into motion.

After the news of De Vick's invention spread, clocks run by falling weights appeared all over Europe.

And then came the use of springs in clocks. No longer was it necessary to have huge weights to furnish power; springs could do it. And, with springs, smaller and smaller clocks could be made. By 1600 there were pocket watches.

About the middle of the 1600's the pendulum clock appeared. It was learned that if a weight is hung on a cord or bar exactly one meter long, one full swing of that weight will take exactly one second. It is believed now that Christian Huygens of Holland was the first to use the pendulum as the regulator in a clock.

By 1600 the interest in inventing complicated mechanical things that would move in curious ways had spread far and wide over Europe. As a hobby, clockmakers made amusing and clever mechanical men. When they were wound up, some could dance a step or two of a minuet. Others could raise a small gun and shoot. Some could sit at a table and eat and drink. But, of course, the inventor had to be close by to see that his mechanical friend did not fall down and break.

THE SPINNING AND WEAVING OF CLOTH

Thousands of years ago people knew how to make cloth. It was one of the first arts and crafts of man. Certainly the carvings and writings in the ancient records of the river-valley peoples show us that cloth has a history of 6000 or more years. Surely spinning and weaving were very, very old crafts.

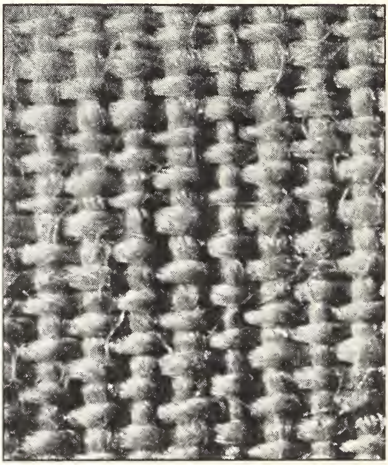


Fig. 121. Cotton cloth magnified

You know what cloth is from your study of *Man at Work: His Industries.*[1] The magnifying glass shows it — just threads which cross over and under one another in certain ways (figure 121). There are really just two steps in making cloth: (1) spinning the thread; (2) weaving the threads; or, to say it more briefly, spinning and weaving.

No one knows who was the first to make cloth by weaving threads. Most students now believe that the art of spinning yarn and weaving cloth goes back 7000, 8000, perhaps even more years.

You know the modern factory way of making cloth today with thousands of spinning frames whirring and looms moving back and forth driven by electric power. Our machine way of spinning and weaving has been known less than 200 years. During ancient times all the work was done by hand.

The threads were spun from cotton, silk, flax, or some other fiber on a distaff or spindle. The spinner whirled the spindle and twisted the threads very swiftly and cleverly. When the fibers were spun into threads, these were arranged at right angles to each other for weaving in the hand loom. Threads were arranged side by side to form the warp. These threads were passed through loops on frames which could raise them up and down in crisscross fashion. The other threads were passed through the crisscrossed warp. To make the work easier, these threads were wound on a spindle and put in a shuttle. Back and forth the shuttle went, with the thread trailing behind it. Up and down went the frames with the warp threads. Closer and closer were the woven threads pressed together, making the cloth.

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[1] If you need to do so to refresh your memory, read Chapter IV again at this time.

In Egypt and Mesopotamia, in China and India, in Central and South America, the spinners and weavers had become very skillful. They made beautiful cloths of many kinds of fibers — even of gold and silver. The Phoenicians and Cretans, the Greeks and Romans and other Indo-Europeans, learned about spinning and weaving. Gradually these crafts were passed on to the people of the changing Europe.

Strangely enough little improvement was made in spinning and weaving until very recent times. The peoples of the Far East had invented the spinning wheel as a quicker and better way of spinning than the distaff or spindle. About 1300 this invention became known in Europe. In the 1500's, 1600's, and after that spinning wheels could be found in most of the houses of the Europeans.

THE INVENTION OF WRITING MATERIALS

"The 1300's and 1400's certainly were inventive times," as one boy put it. Yes, but you have heard very little indeed as yet. For example, what about paper and printing?

No inventions made in these years were more important than those which dealt with printing. There were several separate steps involved: the invention of movable metal type . . . the invention of the printing press . . . the invention of paper . . . the manufacturing of bound books.

But back of the actual invention of printing after 1400 lay thousands of years of slow invention of writing itself. This story was fully told in *Man at Work: His Arts and Crafts,* and we shall not repeat it here. All we need remember is that by 1800 B.C. the Egyptians and the Seirites of the Sinai peninsula had invented an alphabet. The alphabet then spread out in all directions from the Nile and Red Sea region. Northward it went to the Fertile Crescent and Asia Minor; eastward, to India and Iran; northwestward, to Crete and the Aegean; then to Greece and Rome and all over Europe and around the Mediterranean. By the time of Christ not only were there several well-made alphabets in use all the way from India to Britain, but world-famous books had been written. Recall the principal steps by which that occurred.

The Story of Paper

As you read in *Man at Work: His Arts and Crafts,* the story of paper and books has a long, long history, which starts away back to the time when cave dwellers first left records on their walls by drawing pictures. In very early days walls were books. The flat bones of animals were books. The smooth bark of trees, pieces of broken pottery, palm leaves, dried animal skins, soft clay tablets, were books. Stone walls; statues; monuments; the sides of tombs, — all these were the materials on which men wrote.

But by 6000 years ago the Egyptians had found a better writing material — the stems of the papyrus split and pounded and scraped so that they stuck together very tightly. From Egypt the use of papyrus for paper spread far and wide. The Phoenicians, the Greeks, and the Romans learned how to make it; in fact, for 4000 or 5000 years it was the chief writing material of all the peoples around the Mediterranean.

With papyrus books came crude pens and ink — pens of sharpened sticks or reeds; ink of mixed vegetable gum, soot, and water.

In some places during the century or so before Christ there were parchment books made from the dried skin of sheep.

It was in China 2000 years ago that real paper was invented. Someone discovered that the waste left over from the making of silk thread could be washed and flattened into a kind of paste. When dried and smoothed, it could be used for writing. After centuries of experiments and improvements, using old cloth rags, wood pulp, and other materials, smooth sheets of fine paper were made.

Just as the use of papyrus spread, so the Chinese way of making paper traveled across Asia and Europe. By 900 A.D. it was being used in Egypt; by the 1200's, in Spain and France; by 1300, in Italy; by 1400, in Germany; and by 1500, in England.

The Chinese Invented Printing

In the Near East and Europe all writing was done by hand until about 1400. But the Chinese had a kind of "printing" long before that. It began with the making of seals by pressing carved blocks of wood into soft clay. Another step was the inking of sheets of soft wet paper pressed onto words carved in stone. A third step was block-printing. Sheets of paper were pressed over slabs of wood on which designs had been carved and inked. In this way many copies of writing could be made from a single block.

By the 1400's this Chinese way of printing was being used in many parts of Europe. No longer was it necessary for stories or records to be written over and over again each time a new copy was needed.

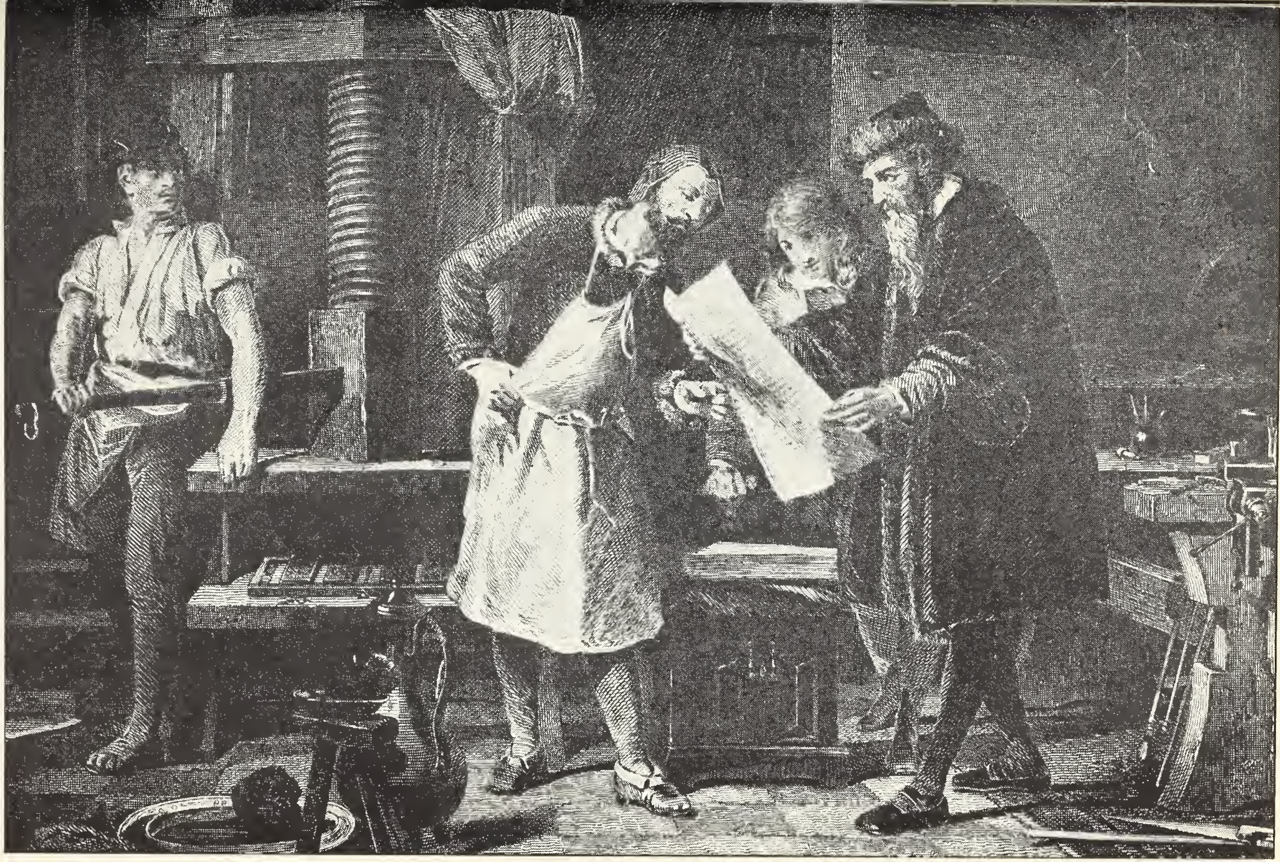
But the real step that led to modern printing was the invention of movable letters. In the 1400's clever European wood-block printers began to carve the separate letters of the alphabet out of wood or form them from lead and iron and use them over and over again as "type." Finally someone got the idea of carving a single metal mold for each letter. Melted lead or iron was poured into this mold. After it hardened and was removed, it was a perfectly shaped letter. An endless number of copies of each letter could then be made.

After the invention of this way of making letters, words to fit a whole page could be lined up in frames, inked, and covered with paper. A neat printed page was the result. Page after page could be made; copy after copy of whole books could be run off!

No one knows who were the first Europeans to use movable type like this. The Chinese had made movable type for a long time and it is possible that the Europeans had learned it from them. Certainly by the 1400's many European craftsmen had heard of it. John Gutenberg of Germany is generally given credit for doing most for the invention of movable type and the printing press in Europe. He and his helpers (probably in 1454) brought out what is believed to be the first book to be printed in Europe — a Bible with 1282 large pages. The type was small and regular, and colored pictures and letters were added for decoration. You can see one of Gutenberg's Bibles in the Library of Congress in Washington today.

From then on printing presses appeared in all the European countries. The idea spread and spread around the world. The first American press was set up in Cambridge, Massachusetts, in 1638.

But during the 250 years after Gutenberg's invention, improvements were added very slowly. The presses continued to



Ewing Galloway

Fig. 122. A wine press gave Gutenberg an idea for making a machine for printing. This is the first press having movable type

be clumsy, slow-moving, and expensive. Then too some rulers were against the idea of people reading many kinds of books. They thought that the common people should read only about religious matters.

Leonardo da Vinci, a Genius of Invention

The astonishing awakening in invention that spread over Europe about 1500 can be summed up in the work of one great inventor of those times. That was Leonardo da Vinci, who was born near Florence, Italy, in 1452. Perhaps never before or since did Europe produce such a genius. He seemed nearly everything a man could be. Artists regard him as one of the great painters of all times. But he was also a musician, a sculptor, and a famous architect.

But not only was he a great artist; he was one of the great engineers of his day. In 1494 he was drawing up plans for improving the irrigation and waterway systems of a large region in Italy. In 1499 he was a military engineer, having the special task of inspecting canals and waterways and keeping them in good condition.

But his curiosity and his knowledge knew no bounds. He was a student of the human body, of plants, and of the earth itself. He was an astronomer and a mathematician. From his studies of the way birds flew, he planned and built a flying machine. He is said to have designed the first parachute. He invented a machine for winding silk and made plans for a power loom.

Here was a kind of mechanical Jack-of-all-trades but, unlike many such, Leonardo da Vinci was master of all! In his own notes was found a description he had written of a needle factory that he planned to build. Does it not read like one today? (He had an eye for business too!)

> I shall make the leather belt and proceed to a new trial. . . . One hundred times in each hour 400 needles will be finished, making 40,000 in an hour and 480,000 in 12 hours. Suppose we say 4000 thousands which at 5 soldi per thousand gives 20,000 soldi: 1000 lire per working day, and if one works 20 days in the month 60,000 ducats the year.

Here are a few of the inventions he actually made: alarm clock; "bevel" and spiral gears; breech-loading cannon; improved pump; improved firearms; roller bearings; rope-and-belt attachment to drive machines; a compass; lamp chimney; parachute; silk-winding machine; spindle and flyer for spinning yarn; standardized house (!); submarine boat; and a new type of fortress with outworks.

But he was a scientist as well as an inventor, one of the truly great minds of history. He predicted discoveries that were later made by Galileo, Sir Isaac Newton, and Francis Bacon.

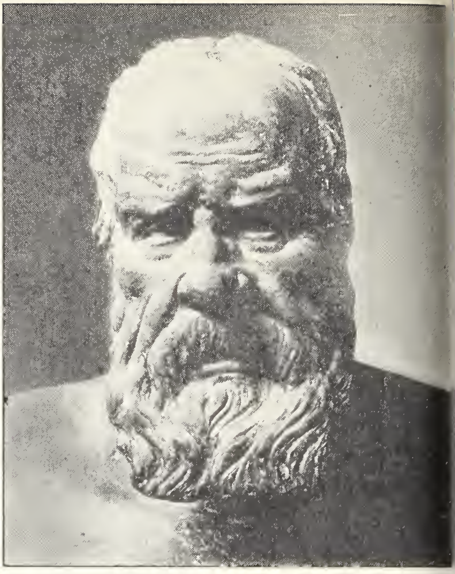
Here, then, in the works of Leonardo da Vinci we have a good picture of the times.

Inventions and Still More Inventions!

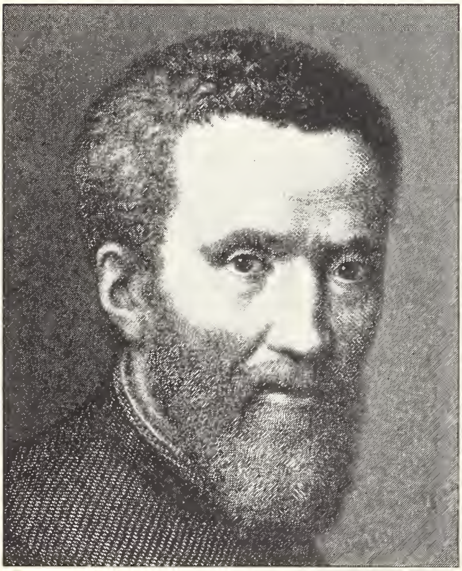
Inventions! In the 1200's . . . the 1300's . . . the 1400's, all sorts and kinds of inventions were changing ways of living and building a new European civilization. New power aids. New tools and implements. New ways of doing work. New instruments with which to observe things either far away or near at hand. Clocks, textiles, and printing.

But you have heard only a part of the story of the remarkable awakening of the people. During the very years that all these inventions and discoveries were being made, other great changes were being made in travel and communication. Daring explorers were going out over the seas and oceans to unknown places. But to do these things certain new inventions were necessary. We shall learn what those were in Chapter XXI.

Leonardo da Vinci, genius of the 1400's



Galileo, famous astronomer (1564–1642)



Michelangelo, Italian sculptor (1475–1564)

Ewing Galloway

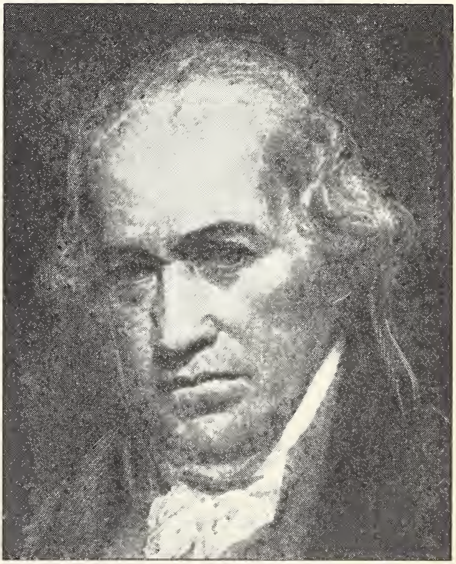
Copernicus, Italian astronomer of the 1500's

FIG. 123. These scientists and inventors

Sir Isaac Newton, English scientist of the 1600's

Roger Bacon, English scientist of the 1200's

Sir Richard Arkwright, inventor (1732–1792)



Ewing Galloway

James Watt, inventor (1736–1819)

helped to create European civilization

Books You Would Like To Read

Bridges, T. C. The Young Folk's Book of Invention. Little, Brown & Company, Boston.

Chase, Anne E., and Clow, E. Stories of Industry. Vol. I. Educational Publishing Company, New York.

Cottler, Joseph, and Jaffe, Haym. Heroes of Civilization. Little, Brown & Company, Boston.

Darrow, Floyd L. Masters of Science and Invention. The Macmillan Company, New York.

Gibson, Katherine. The Goldsmith of Florence: A Book of Great Craftsmen. The Macmillan Company, New York.

Haaren, J. H., and Poland, A. B. Famous Men of the Middle Ages. American Book Co., New York.

Ilin, M. What Time Is It? The Story of Clocks. J. B. Lippincott Company, Philadelphia.

Lamprey, Louise. In the Days of the Guild. Frederick A. Stokes Company, New York.

Maxwell, Marjorie. Story of Books up Through the Ages. Harper & Brothers, New York.

Rocheleau, W. F. Great American Industries; Manufactures. A. Flanagan Company, Chicago.

Smith, Mrs. S. C. Made in America. Alfred A. Knopf, Inc., New York.

Stanley-Brown, K. O. Story of Printed Pictures. Harper & Brothers, New York.

Tappan, Eva March. Makers of Many Things. Houghton Mifflin Company, Boston.

Walden, A. T. Harness and Pack. American Book Co., New York.

Williams-Ellis, Amabel. Men Who Found Out. Stories of great scientific discoveries. Coward-McCann, Inc., New York.

Wilson, R. D. N. Books and Their History Shown to the Children. Thomas Nelson & Sons, New York.

CHAPTER XXI

Inventors and Map-makers

WHEN YOUR family starts out in your car on a trip to a distant place, what does your father do to make sure he will know the direction to follow?

Perhaps he first gets a road map from a garage or service station. This map gives him a picture of two important things: (1) where places are, that is, in what directions they lie from one another; (2) how far apart they are. Of course today it is easy to drive in the United States and in other modern countries even without maps, because the roads and towns and distances are all marked plainly by signs. But what would you do if you were alone in central Asia or Africa, without any signs to guide you?

The Traveler's Most Important Questions

Several years ago the authors of this book were riding in an automobile in southeast Africa. It was a region where there were no roads, no towns or villages. Hour after hour they rode on across the grassy plain. No mountains to guide them. No signs saying, "This way to Mbabane, 74 miles."

Every little while we would say to our guide: "Where are we? In which direction do we go next? How far is it to Mbabane?"

She would look at the sun and our shadow and say: "Oh, we are all right. The sun is over my right shoulder. The town must be to the southeast." And she was correct. In a few hours we found a cart path. Later that turned into a road, and then a big main road took us straight into the town of Mbabane.

"If it were a clear night what would you have done to find your way?" we asked our guide.

"Oh, use the stars. They're just as good as the sun. Of course, if the night were cloudy, we *would* be out of luck," she added. "In that case we'd just camp out till morning."

Even the problem of finding one's way in this part of Africa, without roads or direction signs, is a fairly easy one to solve, because most of the territory has been explored. But imagine yourself in the middle of a strange continent thousands of miles across, with towns perhaps hundreds of miles apart! That was the situation Marco Polo and his fellow travelers faced hundreds of years ago before there were maps and roads and well-marked signs.

Finding Your Way on the Sea

And imagine how very much more dangerous and difficult it was to find one's way about on the seas and oceans! Suppose that you were in a boat drifting in a great sea or ocean hundreds of miles from land. As far as you can see in every direction there is nothing but waves washing to and fro — and sky! No mountain peak rises in the distance to guide you. No church tower or tall building beckons you on. Just a flat sea of water with the sky above, and a little rocking boat under you. Suppose too that you have food and water enough in the boat to last only a few days or weeks. What can you do?

Do you wonder that the sailors of ancient days, who had no maps or instruments to guide them, were afraid to go out of sight of land?

How a Ship Captain Finds His Way Today

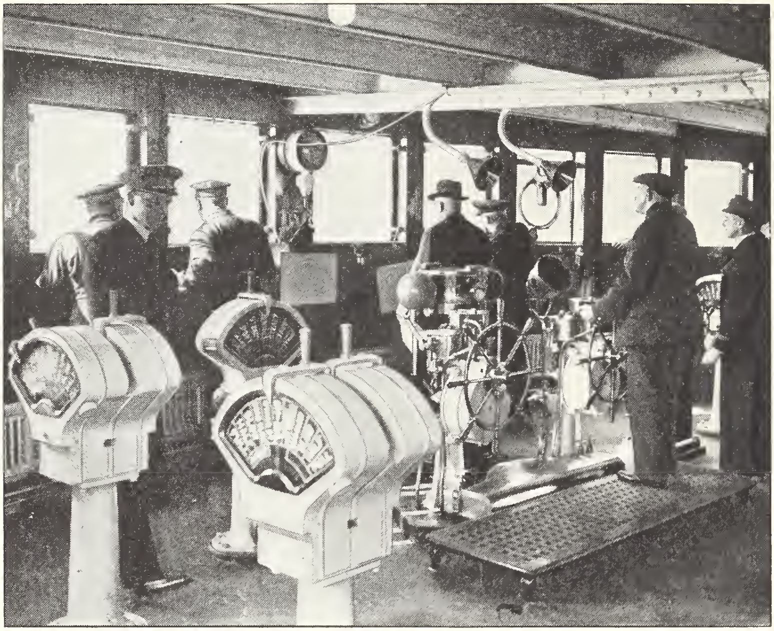
Today a captain can steam out of almost any harbor in the world and arrive exactly on the hour scheduled at almost any other port. And he can do so without the slightest mistake in direction.

In the summer of 1932 the authors of this book left Shanghai harbor in China on an ocean liner bound for Marseille, France. After making their way along the southeast coast of Asia, they stopped at Singapore. From there they sailed west and north until they reached Penang. Traveling westward their boat headed for the island of Ceylon and then skirted the western coast of India until it arrived at Bombay. From there they crossed the Indian Ocean and stopped at Aden on the southern tip of Arabia. Up they went through the Red Sea and the Suez Canal to Port Said and then on through the Mediterranean Sea, stopping at the island of Malta on the way. They arrived at Marseille exactly on schedule — in 30 days and within an hour of the announced time!

Every day of the year hundreds of steamships are sailing on exact and regular schedules all over the "seven seas." How is it done? What makes it possible?

Figures 124 and 125 will help to give you the answer. Briefly, the answer is: Scientific instruments, scientific maps, scientific knowledge.

What a room full of helpers the ship captain of today has! (See figure 124.) There are maps of the entire world, which are very accurately drawn. Compasses are used in steering the ship. A chronometer, a special kind of clock, is a timekeeper which helps to tell the location of the ship by longitude. If the ship is American or British, the chronometer is set by the time at Greenwich, England. Paris time is used by the French ships;



Ewing Galloway

Fig. 124. The bridge of the *Queen Mary*, showing many of the latest instruments of navigation

that of Berlin, by the German ships. Sextants and other instruments measure the position of the sun or stars. Wireless apparatus receives messages telling the captain the position of other ships and the exact time. Scientific books and tables give other information. Most wonderful of all, perhaps, are the mechanical devices which steer the ship even without human hands.

Certainly the captain of a huge ocean liner today — 800 or more feet long, carrying 20,000 tons, 30,000 tons, even 60,000 or more tons — is well supplied with all the things needed to steer it safely from one port to another.

The Captain of the Ship Knows Latitude and Longitude

At noon each day the ship captain takes his sextant, looks at the sun, reads the time on his chronometer, and does some arithmetic with his scientific books. When he finishes his work, he marks the position of his ship on a big map hanging on the wall. The passengers crowd around to see just where the ship is on the earth. What do they see on the map?

If the ship is near the equator in the Pacific Ocean, they might see a small dot on the Pacific part of the map and, beside it, some numbers like "179° West Longitude, 4° South Latitude." If the ship is in the North Atlantic Ocean, the numbers might read: "7° West Longitude, 49° North Latitude." That is, we say that a ship can be exactly located on a map of the earth by its latitude and longitude. What does it mean to say that?

Latitude and Longitude Locate Places on the Earth

From your earlier studies[1] you know that any point on the earth can be located by stating its latitude and longitude. The latitude of a place is the number of degrees it lies north or south of the equator. Its longitude is the number of degrees it lies east or west of Greenwich, England. Therefore, to locate a place accurately on the map you merely state its latitude and longitude.

Locating Places on Maps

Maps as well as measuring instruments make it possible for men to travel on the earth today.

You know by this time, of course, what a map is. It is a picture of the surface of the earth. There are different kinds of maps. A globe is one kind. Since the earth is almost a sphere — merely flattened a bit at the poles — the best kind of world maps are globes. On these the continents, islands, oceans, seas, rivers, can be shown exactly.

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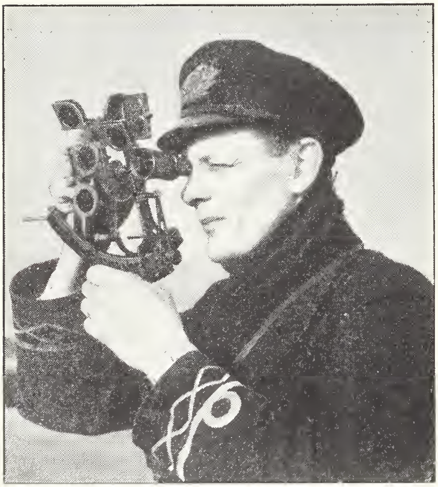
[1] See *Man at Work: His Arts and Crafts.*



Ewing Galloway

Fig. 125. The chief officer on a transatlantic ship uses his sextant to determine the ship's position on the sea

People have globes in their houses and schools, and navigators carry them on ships. But for people to carry globes around with them wherever they go is impossible. So flat maps have always been in demand. For 2000 years and more map-makers have tried to draw a correct picture of the earth on a flat map. To our very own times they have failed. Every kind of map that has ever been made on a flat piece of paper has been incorrect. It makes some things look larger than they really are. For example, look at the map following page 19. Greenland looks almost as large as South America, but actually South America is more than eight times as large as Greenland!

Do you remember the experiment in making a flat map when you studied *Communities of Men*? If not, try it now. Cut the skin of an orange, or the cover of an old baseball, in as large pieces as you can. Then try to press the skin or cover down flat. Do you see how impossible it is to do so without breaking it? That is, in order to lay it out flat you must stretch the surface. Map-makers have had the same kinds of difficulties.

They have not been able to make a flat map which shows the areas of land and waters exactly.

To make a good map today experts called surveyors measure distances between places very exactly. With tape lines they measure lengths. With an instrument called a transit they measure the exact angle that one line makes with another. With a level they measure exactly how much higher one point of land is than another. These measurements can be drawn on large pieces of drawing paper and photographed so as to give a very exact picture of the way places are located on the earth.

A much quicker way and a very exact way also is to photograph the earth from an airplane. In a few hours a skilled air photographer can take pictures of a whole city or a region. Hundreds of separate pictures are taken. The prints are compared, cut, and pieced together. From the result an exact tracing can be made. In this way photographs are being made of the world's highest mountains and deepest canyons, and maps are made from the prints. Such maps could not be made before because people could not go into the places themselves.

For over a century the leading governments of the world have been making exact maps of all the lands within their boundaries. The result is that one can now obtain very accurate maps of large regions of the earth's surface. Many private companies are also working at the task of printing better flat maps. So many improvements have been made that any school or home can have excellent maps with which to study the locations of places on the earth.

So much for a brief review of what is known about map-making today. Let us go back to the beginnings of map-making, and see how men began to find ways of locating places on the earth.

The Beginnings of Map-making

Did we say "to the beginnings of map-making"? It is, of course, impossible for us to do that because no one knows about the very first map. Probably Stone Age man drew maps of some kind or another to tell his neighbors where things were. Certainly nature peoples on the earth today draw maps — on strips of bark, in sand, on bricks, on animal skins and bones. But these maps are very crude. They show only general directions and locations of places.

That the river-valley civilized peoples drew still better maps we know from ancient tablets that have been dug up. One drawn 4000 years ago on a clay tablet has been dug up in Mesopotamia. It is the oldest map now known. Map-making of this kind was also known to the Egyptians 3000 years ago. From the Egyptians the Greeks and Romans and others learned the art.

Travelers' Stories Located Places on Ancient Maps

How were the maps of the Greeks made? There were no exact measuring instruments, so maps were made largely according to the descriptions of travelers.

Herodotus, a Greek historian who lived about 2500 years ago, was one of these travelers. While a young man he left his native Greek town and was gone for seventeen years. All over Asia Minor, Palestine, Syria, around the Black Sea, Mesopotamia, even to the north and east of the Caspian, he went, writing in a book about what he saw. Such a traveler could certainly help a map-maker.

A hundred years later a general, Alexander the Great, and his armies traveled over this region, conquering the peoples and destroying the land. Alexander wished to have records, so he hired "scribes" to write descriptions of the country. "Pacers" went ahead in various directions to measure the distances by "steps." From these records a map was made of Alexander's empire, a land stretching from Iran to Greece, from Scythia to Arabia.

Time passed . . . 100 years . . . 200 years, and more. Other travelers, other rulers, went about, and more maps of the Mediterranean region were made. Then came Julius Caesar, the Roman general and writer (100 B.C.–44 B.C.). Like Alexander, he built roads and made maps and described the countryside wherever he went. His books were also a kind of geography. As you know, the Roman Empire was large, extending from the British Isles and the Rhine-Danube region of Europe to northern Africa and Mesopotamia. Thus more and more territory was being mapped.

After Caesar there was Strabo, the great traveler and writer of geography. And there were others — many others — who increased the knowledge of the map-makers.

Some of these maps were not only very incorrect; they were also very amusing. Those who made them mixed up what they knew to be true with what they imagined. Sometimes the areas about which they knew nothing were decorated with fantastic drawings — snakelike animals called sea serpents, fishes with girls' heads (mermaids), men with dogs' heads or no heads, men with faces set in their chests, cows with wings, babies riding on lions, and the like. One map had a drawing of an ugly, one-legged man using that leg as an umbrella and holding it up over himself.

But more and more information from travelers on land and traders on the seas began to pile up. Gradually it became possible to show the locations of more places — towns, mountains, rivers, plains — and the shape of coast lines, of peninsulas and capes, bays and harbors and islands.

More Exact Measuring Instruments! The Science of Geography Begins

In the meantime students of astronomy and mathematics in Egypt, Mesopotamia, and particularly in Greece after 700 B.C. had been finding out how to observe the positions of the sun and the other heavenly bodies. To do so they needed some kind of measuring instrument. What they used before the time of the Greek scientists, we do not know; but some time during the 400 years between 250 B.C. and 150 A.D. an instrument known as the astrolabe was invented. This enabled navigators to observe the positions of the heavenly bodies. With such knowledge they could figure out the location of their ship on the earth's surface. For nearly 2000 years — until the sextant was invented in the 1700's — the astrolabe was the best instrument with which to measure the height of the sun or a star in the heavens.

Map-making from 140 A.D. to 1500 A.D.

About 1800 years ago there lived in the city of Alexandria, Egypt, a Greek scientist whom we know as Ptolemy. Ptolemy had studied the works of the mathematicians and astonomers before him. Among these Pythagoras (who lived in the late 500's B.C.) and Euclid (about 300 B.C.) were important. But perhaps most famous of all was Hipparchus, who was born in Greece about 160 B.C., and who later moved to Alexandria, the great center of learning at that time.

In his studies Hipparchus made very exact measurements of the heavenly bodies; in fact, he prepared lists of over 1000 fixed stars. It is believed that he was the one to begin that branch of mathematics called trigonometry. He had shown in his books that the only exact way to locate places on

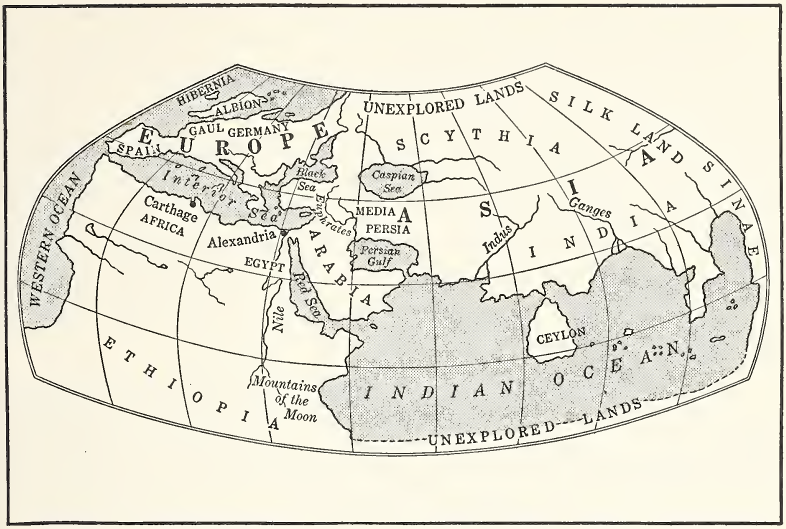


FIG. 126. A map of the world according to Ptolemy

the earth was to find their latitude and longitude. But still he and the others lacked measuring instruments with which to do it. Then, as you know, the astrolabe was invented, and scientists and navigators became quite skillful in using it.

By the year 150 A.D. Ptolemy had collected much information about the location of places in Europe and around the Mediterranean Sea, in the Near East, and even in Asia. He wrote his book *Guide to Geography*, which was published in eight volumes. It contained lists of places with their latitude and longitude. In it also was a map of the world (figure 126). Study the map carefully, remembering that this was regarded as the "standard" map of the world for 1400 years after Ptolemy's death.

Perhaps you will say, "What a funny map!" Yes, things do look somewhat out of place. And the continents of Europe, Africa, and Asia seem very different from the way we see them on our maps. But the Mediterranean world is much the same.

But notice how much Ptolemy and his fellow workers of 150 A.D. did know! They knew that the earth was round. They knew too that places could be located as we locate them today, by longitude and latitude. They knew the general shape of Europe, northern Africa, the Red Sea, Arabia, and the Near East. Although areas on Ptolemy's map were pulled out or squeezed in too much, he knew a good deal about the location of lands and waters in as much of the world as was known at that time.

You have probably noticed that all of North and South America, Australia, and half of Africa are missing on Ptolemy's map. That is because they were not known in his day; indeed, they were to remain unknown for the next 1400 years! And about Asia he and his neighbors certainly knew little.

As you already know, with the fall of the Roman Empire in the 400's A.D. scientific work nearly died out too. In the 600's and 700's the Mohammedans conquered the south Mediterranean region from the Near East to Spain. Alexandria and other centers of learning remained in their hands for centuries. Only rarely did a scientist make an important addition to the knowledge of the geography of the earth. For many hundreds of years the Dark Ages kept Europe in ignorance of even the earth itself and its lands and waters. Is it any wonder, then, that Ptolemy's map continued to be one of the best in existence? One can say truly that the world maps made by Europeans in the 1200's were far "funnier" than his!

For hundreds of years, then, the traders and travelers of the Mediterranean region and of all Europe continued to navigate the seas and tramp and ride their animals over the land, using poor maps. They had no compasses. They had only the astrolabe to guide them.

After Ptolemy more than 1300 years were to pass before a great awakening came. Then, however, the Europeans really woke up and went at their astonishing work of exploring the earth.

But it is important to remember that not all Europeans were afraid to go out of sight of land. There was one exception — one group of daring adventurers who prepared the way for the period of exploration. About these we shall read in the next chapter.

Books You Would Like To Read

BACHMAN, F. P. Great Inventors and Their Inventions. American Book Co., New York.

BARSTOW, C. L. Explorers and Settlers. D. Appleton-Century Company, Inc., New York.

COTTLER, JOSEPH, and JAFFE, HAYM. Map Makers. Little, Brown & Company, Boston.

DOUBLEDAY, RUSSELL. Stories of Inventors. Doubleday, Doran & Company, Inc., Garden City, New York.

DUKELOW, J. H., and WEBSTER, H. H. Ship Book. Houghton Mifflin Company, Boston.

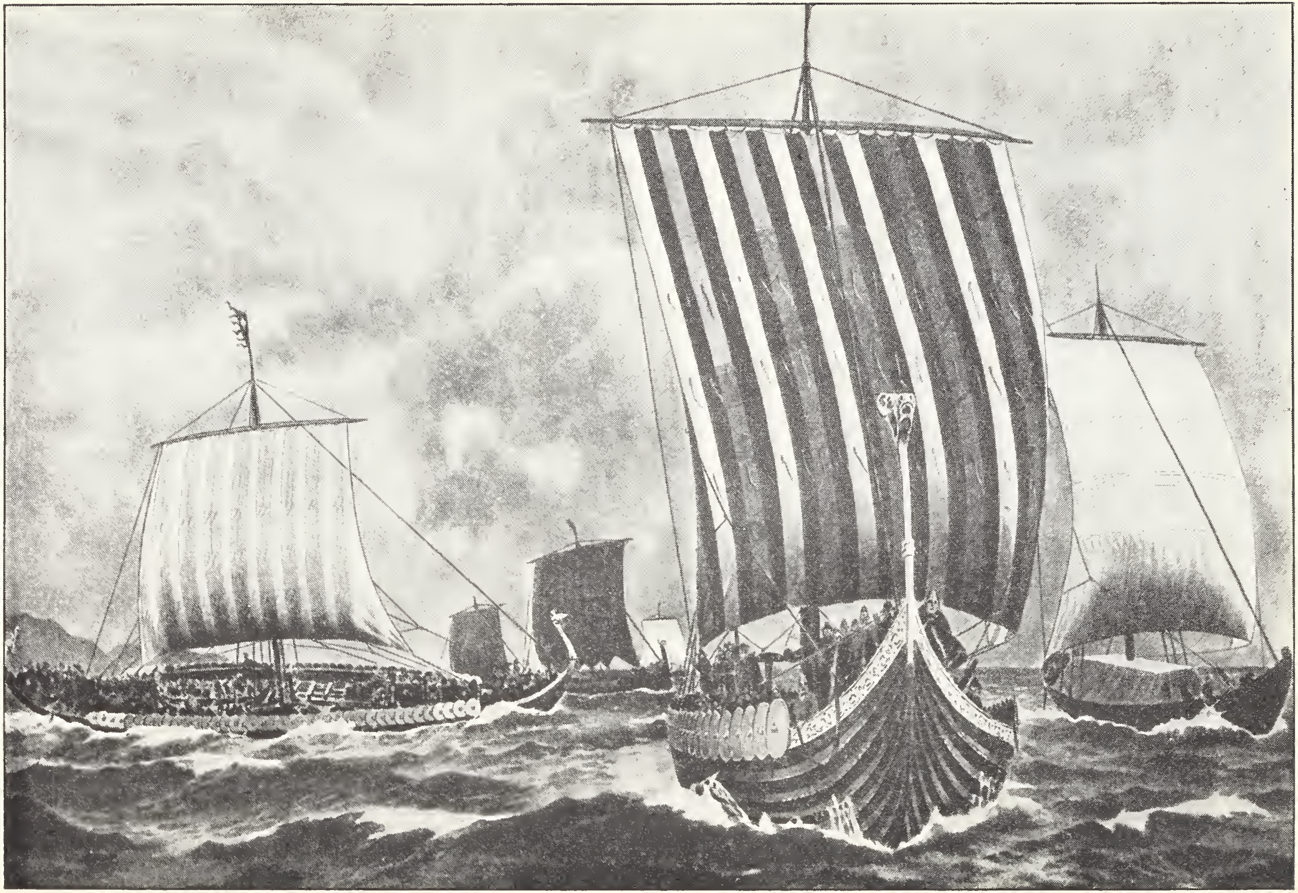
HAWES, C. B. The Great Quest. The Atlantic Monthly Press Publications, Boston.

MCDONALD, LUCILE SAUNDERS. Dick and the Spice Cupboard. Thomas Y. Crowell Company, New York.

OUTHWAITE, LEONARD. Unrolling the Map: The Story of Exploration. John Day Co., Inc., New York.

Our Changing World Series. Paddles to Propellers. Thomas Nelson & Sons, New York.

Our Changing World Series. To Far Cathay. Thomas Nelson & Sons, New York.



Ewing Galloway

Fig. 127. For several hundred years the Vikings sailed the seas and carried on war in these small sailing vessels. The shields of the warriors hung on the sides

CHAPTER XXII

The Norsemen Discover a "Wondrous Land"

Geography Helped To Make the Norsemen Sea Explorers

Of all the peoples that helped to build up the new civilization of Europe after 500 A.D. the Norsemen were among the most important. They lived far to the north, in two little peninsulas: Jutland (now Denmark) and Scandinavia (Norway and Sweden). Their lands reached from 55° to 71° north latitude. This is a distance north and south of about 1100 miles. About 60,000 square miles of this territory is actually north of the Arctic Circle ($66\frac{1}{2}°$).

So far to the north is this land of the Norsemen that — in northern Norway, for example — from the middle of May to the end of July the sun never sets. Round and round it goes each day on the horizon, never "rising" and "setting" as it seems to do in our region on the earth. For that reason their home has been called the "Land of the Midnight Sun."

From the middle of November to the end of January the people never see the full light of day. They live in twilight all the time.

But there are other geographic surprises about this land of the Norsemen. We cannot tell you about all of them in this book, but we shall mention two, for they help to explain why the Norsemen were such wonderful seamen and explorers. The first is that there are many warm-water harbors in this northern land.

What Makes the Warm-Water Harbors?

Are you surprised to hear that there are warm-water harbors in this Far Northern region? Should not waters on the border of the Arctic Ocean be cold and frozen the year round? One would think so, yes. And much of Scandinavia does have cold and freezing winters for nearly seven months each year! But the western part of Norway is so warm even in winter that the waters of its harbors never freeze. All year long, every month of the twelve, the Norwegian fishermen can sail their ships in and out of their ports.

Map 16 (page 421) shows you why such shipping is possible. First, the warm Gulf Stream flows along the entire coast of Norway; second, the winds blowing toward the coast from the west pass over the Gulf Stream and thus bring warmth to the Norwegian harbors. And as the Gulf Stream and the westerly winds are today, so they were, at least approximately, 1000 to 1500 years ago.

But there is another geographic surprise which makes this sea trade possible — the coast line! As map 11 or map 16 shows, it is not smooth and unbroken, but indented mile after mile throughout its length. Hundreds of little "arms" of the sea, called fiords (fyôrdz), flow between steep banks and cliffs. These inlets were first formed by great upheavals of the earth and then widened during the glacial periods when the ice sheets that lay over this entire region began to melt. Down the mountains rushed the streams, scooping out the land on the mountain coast line as they went. For thousands of years these rivers have been cutting their way back and back into the hills, forming bays and inlets and wonderful harbors. Thousands of islands were also left standing in the water. (The number is now believed to be 150,000!)

This jagged, uneven coast line is 12,000 miles long! "Twelve thousand miles!" you exclaim. "It looks nearer 1500 miles on the map!" Yes, by direct line the coast line is only 1700 miles long. But so winding and so indented is it that the total distance is 12,000 miles. (Some of the fiords run into the land 100 miles!)

Can you understand why the Nordic peoples who settled along this coast of warm, protected harbors 2000 and more years ago became fishermen? Can you see how easy it was for them to sail in and out of the fiords — never out of sight of land? Was it not natural for them to become very skillful and gradually more daring seamen?

The World's Best Navigators of 1000 Years Ago

Little by little these Norsemen sailed out on the open sea in their little boats. Farther and farther they ventured as they built better boats and as their skill and courage increased.

In the 700's and 800's these Scandinavian fishermen-traders became the most famous and most feared people in all Europe. Without compasses, sextants, or other instruments or good maps to guide them — even without decks or covering on their 60-foot ships — they learned to sail across rough seas. Hundreds of miles out of sight of land, even through dense fogs, they made their way. They decided what directions they would take by the feeling of the wind, the movement of the tide, the color of the water. Fearlessly — even joyously, for they loved a battle with unknown seas — they pointed their ships out across the North Sea and through the English Channel, even around the Spanish peninsula and into the Mediterranean.

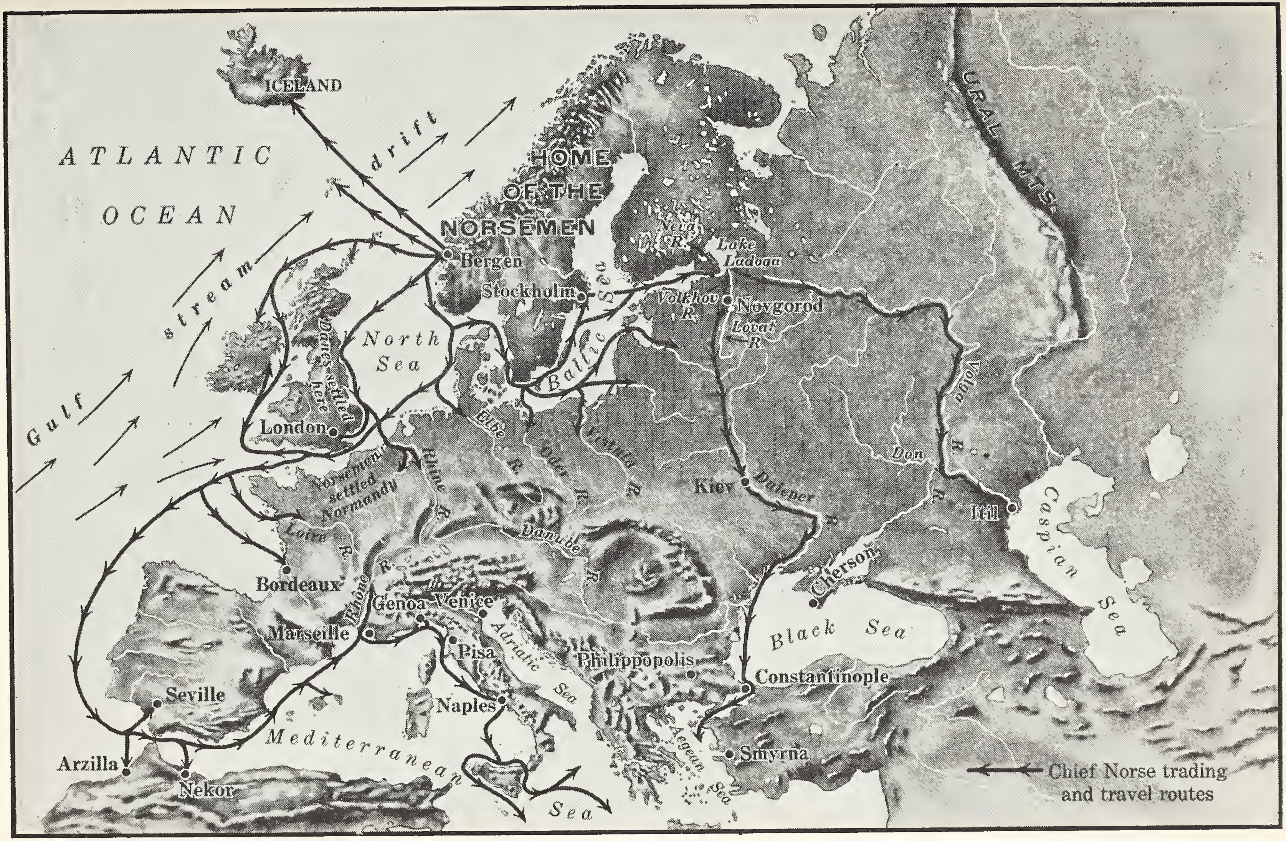
For adventure and for plunder, these blond Vikings, as the Norsemen called themselves, raided their neighbors all over Europe. They were to be found from the British Isles and the west coast of Europe, across the central German territory as far east as Russia. Sometimes a band of 40,000 fighting men sailed up the rivers in their boats, capturing and destroying towns, killing and robbing the people. Every region of Europe learned to dread the Vikings.

We remember them today, however, not for their raids and conquests, but for the way they developed new "water routes of trade." Map 16 shows one of the most famous of these. Across the Baltic Sea to the Neva River it led; up that river to Lake Ladoga; then up the Volkhov and Lovat rivers as far as the ships could go. There the voyagers left their ships and crossed by land to the Dnieper River, where they again went by boat, sailing down to the Black Sea and on to Constantinople. This water route became the main highway of the north.

Meanwhile other Norsemen were robbing as well as trading in western Europe. In the late 800's some of them conquered northwestern France and settled down to live on farms or in villages and towns. Their region was called Normandy; and their leaders became known as the dukes of Normandy. It was one of these, Duke William, who crossed the English Channel with a large fleet and defeated the Saxon king Harold at the battle of Hastings in 1066. As a result Duke William made himself king of England. Ever since that time he has been known as William the Conqueror.

A People Trained by Hardship To Explore and Settle

Life at home prepared these Norsemen for their work of exploring and settling large areas of the earth. In the first place, their climate trained them to endure hardship. As children and youths they were used to long winters — seven or eight months of cold. After being shut in by ice and snow, you can imagine how they enjoyed the green grass and bushes



Map 16. This map shows the new water trade routes developed by Norse traders. Find Normandy, where some of the Norsemen settled

and trees during the short summer season. And those who had traveled south to the Mediterranean region could talk of little else when they returned to the northland.

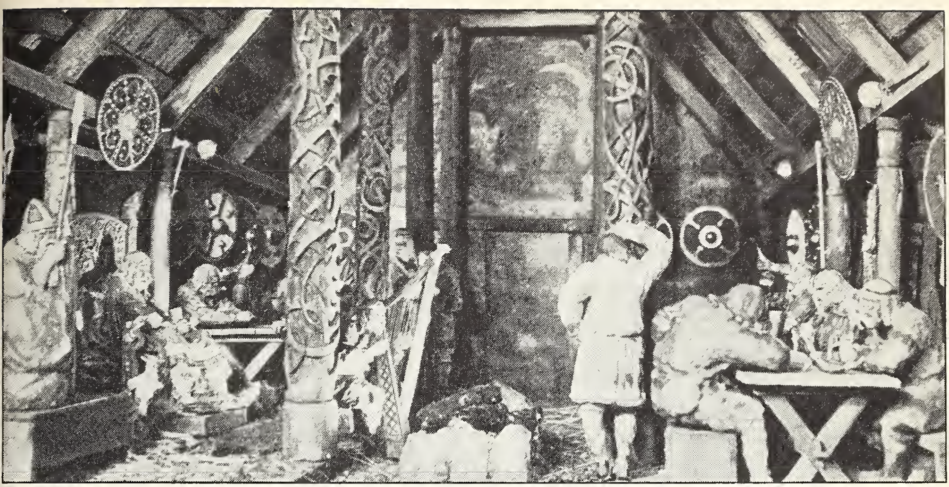
The children became used to a simple life. They grew up expecting few luxuries. They had few cities, because most of the people lived on large farms called "homesteads" or on "estates." The houses, built firmly for protection against attacks, had few rooms. There was a great hall which served as bedroom, living room, and dining room. There was a special kitchen and a separate "temple," or room for the worship of the gods.

These Vikings lived a life of danger most of the time. From childhood the boys were trained to be ready at any moment to defend themselves. They had to be able to protect themselves in times of storms or floods. They had to know how to meet the attacks of human enemies. A youth or a grown man seldom went outside his own gates without a knife and ax at his belt, a sword and shield in his hand. Armor was worn by the warriors in battle.

The times themselves — the 800's and the 900's — were marked by danger for all communities. No town or city of Europe knew when it might be suddenly attacked by an enemy. Defeat meant death for most of the men and slavery for the women. During the 900's the housework and much of the farmwork in these northern lands were done by slaves who had been taken in raids on the coasts of northern Europe.

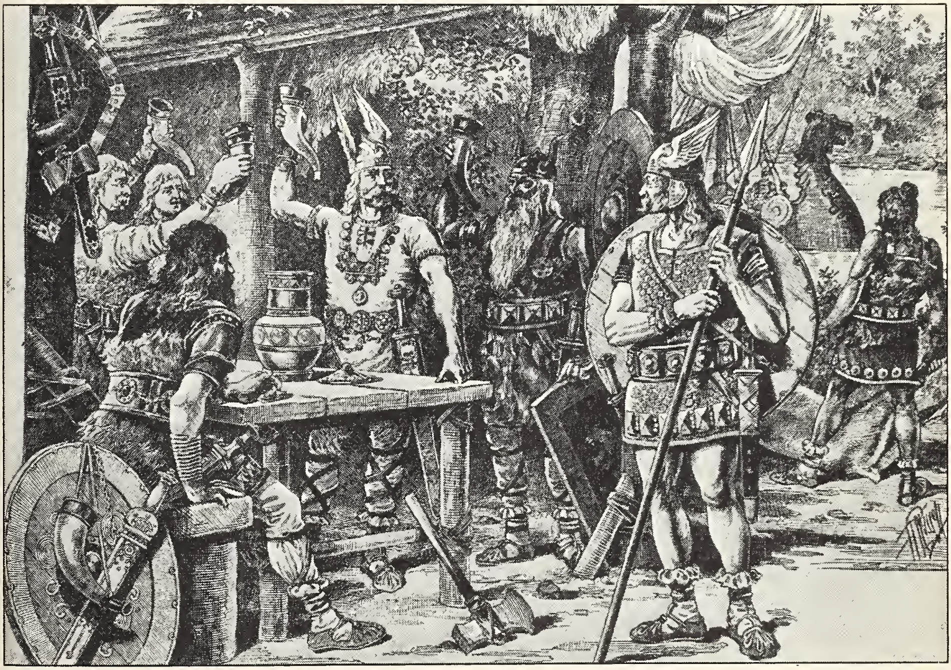
The religion of the Vikings consisted of superstitious beliefs and ceremonies to the gods. In this respect they were very much like the Stone Age peoples about whom we read in earlier chapters. Today we call them "pagan." Not until the 900's did they become Christians.

There was little reading and writing among them, and no literature or music or theater as we know it. There was much



Dwight Franklin from Ewing Galloway

FIG. 128. A sculptor portrays life in a Viking hall



Ewing Galloway

FIG. 129. Norsemen celebrating their discovery of the New World

storytelling, however; much conversation, much drinking and eating and talking together, much entertaining. The stranger could remain a guest for weeks or months at a time.

Before 1000 a sturdy civilization had developed in the northland of Europe. Here was a brave people, an alert people, who for 1000 and more years had proved themselves strong enough to live through serious dangers and difficulties. These tall, light-haired, and blue-eyed Norsemen were prepared to make their way round the earth.

As you have seen, in the 700's and 800's, they had explored all of Europe from southern Russia to the British Isles and Normandy, France. Then, between 870 and 930 they made one of the most important discoveries of all history. This was not in the British Isles, nor in France, nor in the Mediterranean region. It was far away, in another part of the earth.

Thus the Norse Were Prepared for New Explorations and Discoveries

In order to understand how these discoveries took place, let us look at map 17 and, more closely, at the following places:

First. Norway, 58° to 81° north latitude, reaching far above the Arctic Circle.

Second. Denmark, 54° to 57° north latitude.

Third. Ireland, 52° to 56° north latitude.

Fourth. Scotland, 55° to 58° north latitude.

Fifth. Iceland, located at 63° to 66½° (Arctic Circle) north latitude.

Sixth. Greenland, located at 60° to 83° north latitude.

Seventh. Labrador, 52° to 60° north latitude; Newfoundland, 48° to 52° north latitude; Nova Scotia, 44° to 47° north latitude; and northeast United States.

Eighth. Vinland (Maine to Virginia in the United States) located from 37° to 45° north latitude.

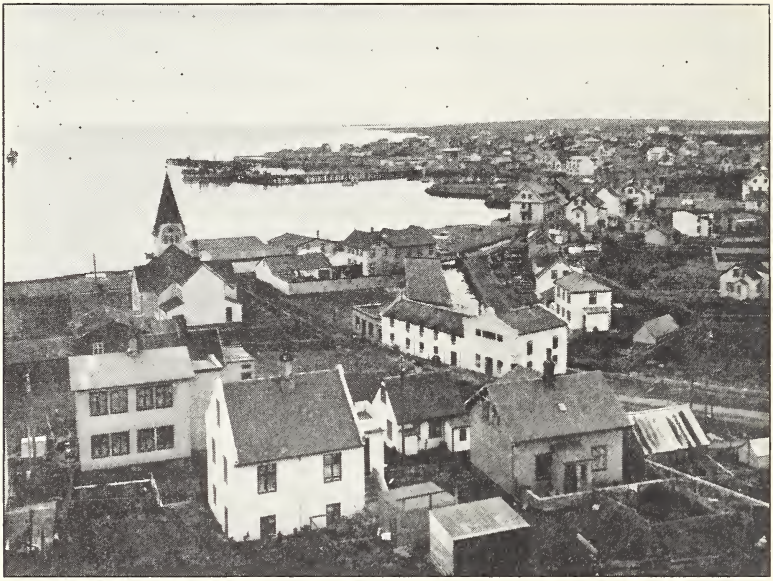
Ninth. The groups of islands — (1) the Faeroes, (2) the Shetlands, (3) the Orkneys, and (4) the Hebrides — that lie in the sea route from Norway to Iceland or from Scotland or Ireland to Iceland.

These locations form one vast northern region reaching from Norway to the northeast coast of North America, with Iceland and Greenland standing between them. Now the Swedes, facing eastward and southward, naturally explored and settled across the Gulf of Bothnia and the Baltic Sea. Their "water routes" ran through Russia and the Black Sea to Constantinople and the Mediterranean. The Danes, inhabiting Jutland, naturally moved southward as the Angles and Saxons had before them, settling England, Ireland, Scotland, and the near-by islands. But it was the Norwegians, living far north, who sailed westward and northward through a vast region. So you see they could hardly help but find new lands to the west. And in or about the year 850 they did just that.

Iceland Settled in 870–930 by Norwegians and Irish

The Norwegians were not the first to reach Iceland, however. Families of daring Irishmen had built homes on this island of glaciers and volcanoes long, long before the Norwegians. But they were few in numbers, and no real settlement was made by them. After 870, however, several large streams of settlers flowed out of Norway and Ireland to Iceland.

First, four Norwegian nobles who would no longer obey the government of their king, Harald the Fair-Haired, decided to live there. They loaded their families, hundreds of thralls (a thrall was like a villein in the medieval manor, not a freeman, yet not quite a slave), their household goods and other belongings into their boats, and sailed through the North Sea to Iceland.



Ewing Galloway

Fig. 130. The fishing village Hafnarfjördur, center of the dried-fish industry in Iceland. What does it tell you of civilization in Iceland today?

The second to move to the island with a large number of followers was the Irish Queen Aud, widow of Olaf the White, who had been king of Dublin. She had been living on one of the Western islands in exile. From the same islands a secret order, or society, of Viking warriors also traveled to Iceland. Shortly afterward 900 more Norwegians who were dissatisfied with their government followed the same route and completed the settlement.

How many people were living there in the 900's and 1000's, we do not know. By 1100, when records were being kept, there were about 4500 homesteads and about 50,000 people. The history of Iceland had begun.

Today European Peoples Still Live in the Land of "Ice and Fire"!

Today, almost exactly 1000 years after the first settlement of Iceland, there are about 100,000 Icelanders. They are not Eskimos; nor are they nature peoples. Instead they are descendants of some of the proudest liberty-loving white peoples of Europe. For 1000 years they lived on there, and much of that time they have been free and independent peoples. It would be difficult to find anywhere on the earth a people more firmly loyal to their own country than are the Icelanders. "We are not Irishmen!" they say; "We are not Norwegians! We are Icelanders!" Although their language is somewhat like the languages of the Scandinavians, it is still a separate and independent one. A wonderful collection of stories and epic poems have been written in the Icelandic tongue.

The Second Steppingstone of Westward Discovery

For the first hundred years the Norwegians and Irish settlers in Iceland lived on their northern homesteads in much the same ways. They hunted and fished and raised animals. They held great banquets and entertainments. They even fought among themselves. Each spring and summer their little trading ships went back and forth to Ireland and Scotland and Norway and Denmark and the islands in between.

In one of the early years — probably between 910 and 920 — the little ship of Gunnbjörn, son of Ulf Kraka, was blown off its course on a return trip. For days Gunnbjörn battled the storms west of Iceland. When finally he landed safe at his homestead, he and his men reported that they had seen huge rocks in the western ocean and a land, greener than their own, beyond it. But fifty, sixty, seventy years passed before any Norse ship either by accident or by plan saw this land again.

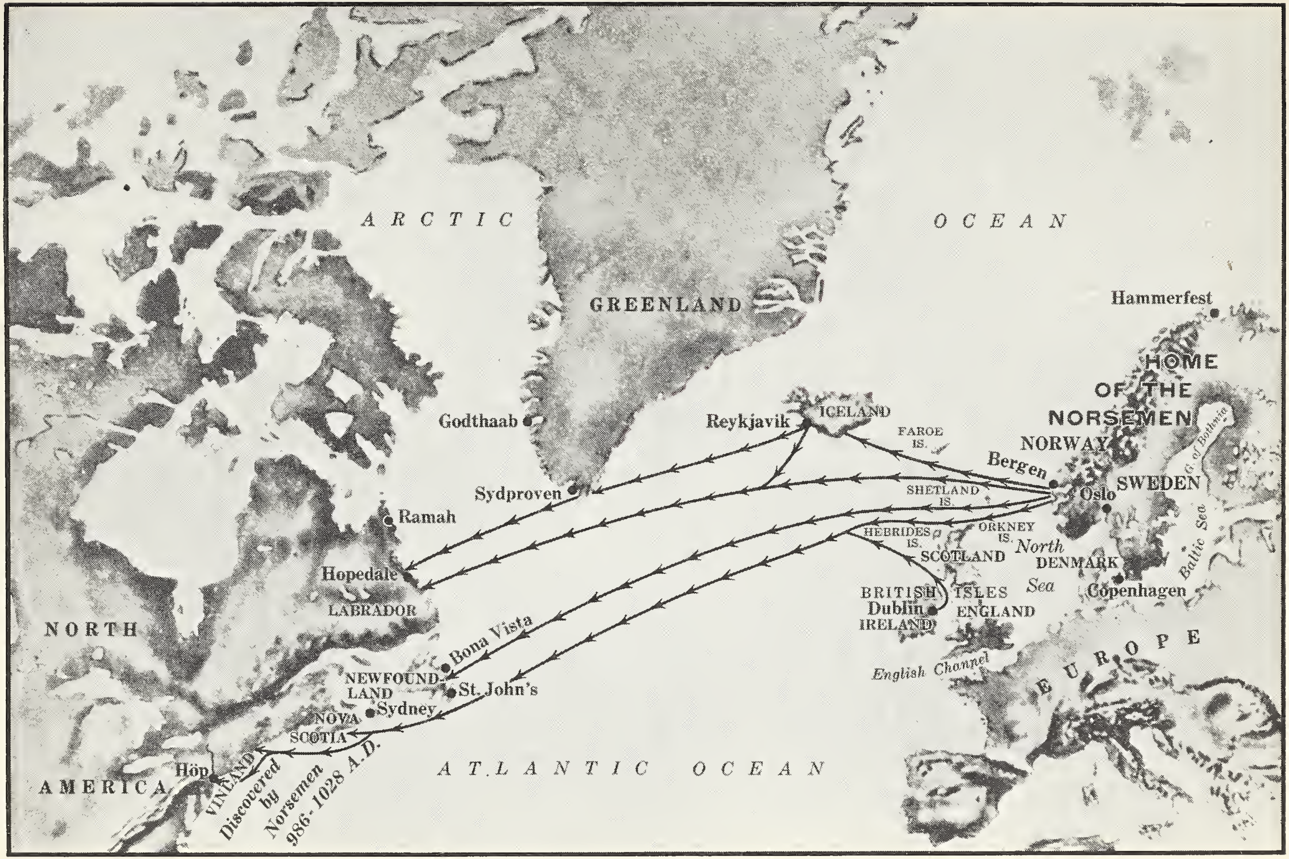
Then came the year 982 and the famous battle in which Erik the Red, the fiercest young warrior on the island, killed some men while defending his own property. When anyone did such a deed, it was the custom to send him away. Erik was exiled for three winters. Instead of going to the courts of Norway or Denmark, as most of the other exiles had done, he took a crew of followers and explored the waters to the west.

For three years Erik the Red was gone. In 985 he returned with a wonderful tale to tell. And tell it he did, the length and breadth of Iceland. After hearing the story many times the people began to think of this young man as the hero of their country.

The Gunnbjörn Rocks were there, he proclaimed, as Gunnbjörn had said. But beyond them was a wondrous land! Not an "ice land," but a "green land"! Such a land for homesteads! Better than anything in their own country! You see Erik had made up his mind to lead an expedition back to settle "Greenland" the very next spring, so he described it as "the best of lands."

And so it came to pass. In the spring of 986 he started for Greenland with 24 boats in which were cows, sheep, horses, furniture, and about 900 Iceland people — men, women, children. In the midst of the journey a terrible earthquake occurred. Five ships were sunk and four more turned back. But Erik's boat and fourteen others got through and landed safely on the shores of Greenland.

Almost at once these Icelanders began to build their homesteads on the southern coast of Greenland. And what difficult times they had trying to erect their houses and provide pasture lands for their animals! They had to supply themselves with



Map 17. The voyages of the Norsemen across the Atlantic Ocean

food by hunting and fishing and trading. Indeed, they had a terrible struggle even to keep alive. But slowly they managed to settle down and live more comfortably in their new homes.

More Discoveries Still Farther to the West

Greenland, however, was to serve as another steppingstone to even more exciting discoveries by the Norse navigators.

This time new land was to be found by Bjarni Herjolfsson, son of one of the great families of Iceland and captain of the best ship of their trading fleet to Norway. In July, 986, Bjarni returned to his father's homestead in Iceland with a fine boatload of goods, only to find that the whole family had left with Erik the Red for Greenland! Without even unloading, he and his men started northwest for the unknown land. They had not gone far when they were caught in a terrific gale and then in a dense fog, and were blown off their course to the south. For days and days they sailed on without sun or stars to guide them. Lost! Lost on the North Atlantic! More days — 22 in all — passed. Then the skies cleared, and in the morning they sighted land.

But this was not the shore of Greenland! Bjarni Herjolfsson knew that, because the land was low and covered with forests. Greenland, like Iceland, was mountainous and capped by glaciers. Almost no trees grew there. So they turned north and east and sailed on without landing on the strange shores. (Look at map 17 carefully. What land do you think they were seeing?) For two days more they sailed. Then suddenly the "lookout" in the front of the boat called "Land ahead!" Bjarni and the crew looked eagerly. Then Bjarni said: "But this is not Greenland! This land is low and wooded." (From map 17 can you tell what land this probably was?) Again they went on, still northeastward.

Finally after three days the voyagers saw mountains and glaciers in the distance. Here at last was Greenland, their new home. And soon they were reunited with their relatives and friends. Great was the rejoicing at their safe coming, especially since they had made the voyage without maps or instruments and without having been there before. Banqueting and talking went on for days. Day by day they told of the strange lands they had seen to the southwest.

"There is a green land," they said. "A low, wooded land! A warm country. More land to the west! What can it be?"

Many a young man listened excitedly and thought to himself: "I'll be the first to set forth to that land. Those forests! What a treasure for our people who have so little wood for ships and houses and furniture!"

Leif the Lucky Explores the "Wondrous Land," 999

Erik the Red's people lived on in Greenland thirteen more years before they again heard news of the land to the southwest. Trading ships traveled back and forth to Iceland and to Europe. Gradually living became more comfortable on the southeast coast of the great island. The population increased.

Then came the year 999, just at the turn of the new century. It was in that year that Leif Erikson, son of Erik the Red, and the best young navigator of Greenland, sailed his own ship with 30 fine sailors to Norway. After months of adventure they started back on the long return to Greenland. On the way their little boat was blown far to the south by a gale. For days and days they went on, not knowing where they were.

Then the air cleared and the sea became calm. In the morning Leif and his men saw land before them. "Low land! Forested land! No mountains! No glaciers! It cannot be

Greenland!" they said. "It must be the mysterious land to the southwest! This time we shall step foot on it and explore it. We shall find out what kind of land it is, what kind of people live here."

The First Landing in North America

So, in October, 999, the first Europeans to land in North America (for that was what it was!) ran their boats up on the beach and began to explore the land. Although it was autumn, the air was warm compared with that in their northland. "We must be very far south, indeed!" they decided.

Through forests of tall oaks and maples, beeches and birches and other kinds of trees, they searched. Over rolling valleys and along clear streams they wandered. There were bushes loaded with delicious berries. Finally a German member of the crew came running, holding up bunches of blue fruit. "Grapes!" he shouted. "Grapes, like those at home in Germany! Now we shall have wine!" In the streams they caught fish. In the woods they killed the deer. On the level lands they found a kind of grain. This was, as we know, maize, or Indian corn, which grew wild. To these Norsemen, who had to import all grain from Europe, the discovery was exciting.

Food was plentiful. Wood was plentiful. The countryside was beautiful. The air was pleasant. "A wondrous land, indeed!" they said. "How glad everyone at home will be to hear of it!"

For a week the Icelanders stayed on the land which today we know to be a part of the New England shore in the United States of America. During that time not one human being did they see. Leif named the region Vinland (Wineland), and Vinland it was to be known by his people for a long, long time. Then he departed, sailing northeastward for days and days.

Ewing Galloway

Fig. 131. As an artist imagines Leif Erikson on one of his explorations

On the way he rescued a party of Norsemen whose boat had been wrecked. Fortunately they had been able to swim to some huge rocks that stuck up out of the sea. For this deed Leif was ever afterward known as Leif the Lucky. (To save people from the sea was believed by the Norsemen to be a sign of good luck.)

Finally the travelers landed safely on the shores of Greenland. Then what a hero was Leif, the first man to set foot on the land to the west! Vinland and its wonders were on every tongue. Many young men — and women too — made up their minds to go there. The older people said that they must send ships there to get lumber, which they needed so much in the bare, cold lands of Greenland and Iceland.

But it was difficult to arrange to send a ship to Vinland. Ships were scarce. Every vessel was needed for the trade with Europe. There were no trees to supply the lumber to build more ships, tiny though they were.

In the next year, 1000, Thorwald, another son of Erik the Red, did get a boat off to Vinland. He and his followers landed at what is now Nova Scotia. This time they found people — the red-skinned natives of the land. They called them "Skraellings," which meant "barbarians." There were hundreds of them, coming out from the shore in long, narrow canoes. Battles followed between the two peoples. Many of the red-skinned warriors were killed and some of the Norsemen. Thorwald himself was killed in the fight. However, his men got away, explored the coast, and finally returned to Greenland.

The First White Settlement

The years passed with much talk in Greenland and Iceland about Vinland and its red-skinned Skraellings. They must settle this wondrous land and make use of its riches.

In 1005 a fleet of several boats was launched under the leadership of Thorfinn Karlsefni and his wife Gudrid. They sailed south and westward with 140 people on board, landing at several places on the coast. During one of their stays on land an interesting event took place. In October a son, Snorri, was born to Gudrid and Thorfinn. So far as we know, this is the first white child to be born in North America.

For a whole year this band of Norsemen explored the land farther and farther to the south. In June, 1006, they sailed into a wonderful harbor where a river joined the ocean. The harbor was what we call New York today, and the river was the Hudson. Here the travelers landed, built log dwellings, and prepared to settle, giving the name Höp to the region. Skraellings came to them also — peaceable ones, however, with whom they traded and lived quietly for a year. Then an accidental killing of a native by a white man occurred, and war started. People were killed on both sides. The Norsemen decided to sail away to the north and hunt a safer place to settle.

Another year of wandering passed. During that time they lost all their animals — horses, cows, and sheep. Quarrels broke out among them. It was then that Thorfinn and Gudrid decided to return to Greenland and Iceland. They had explored a huge continent — so it seemed to them. (Actually they had explored from Newfoundland to New York.) As explorers they were successful; but they needed larger numbers to start real colonies. They needed more people to fight off the Skraellings and build new homes on the continent of Vinland.

In 1007 — after nearly three years of absence — those of the group who were still alive landed in Greenland.

Years passed. Some of the people who had gone on this first trip talked often of trying again to settle in Vinland. But never could they get together enough people or enough ships.

A big company must go, perhaps 1000 people. Without that number it could not be done; the Skraellings would beat them off.

But they did try once again. This time it was not a warrior, but a daring Norsewoman who made the attempt. She was Freydis, an adventurous daughter of Erik the Red. The exact year in which the expedition of 70 people — men, women, and children — and their animals and supplies sailed is not known. It is thought to be about the year 1020.

The voyagers landed on a coast still farther to the south than the others (probably the shore line of what is now Virginia). Almost at once there were battles with the Skraellings. Then there were quarrels among the settlers. Finally in a terrible slaughter one half of the expedition was killed by the other half. The living ones returned to Greenland, some to be punished for their deeds while in Vinland.

Never again did either Greenland or Iceland send an exploring or settling expedition to the western continent.

The Last Norseman in the "Wondrous Land"

But before the curtain falls, shutting the western continent from European eyes, we must repeat the story of a Norse ship that did land on America's shores. It was in the year 1028 A.D. that Gudleif Gudlaugsson and 35 Icelanders, sailing out of the harbor of Dublin, Ireland, headed for home. They too were blown southward out of their course. After weeks of drifting they landed on the beautiful shore of a strange land. (We believe today that it must have been Virginia, on our own coast.)

They knew it to be Vinland, for the Skraellings appeared on the first day. The white men were surprised; in fact, they expected to be killed. Then, to their great astonishment, the leader of the tribe appeared. He was a tall blond white man, wearing a gold helmet and white men's clothing, with an ax and two swords at his belt!

Here was a Norseman who had become chief of the Skraellings! The Icelanders learned that he had lived there 20 years. Through many strange events he had become the Indians' chief, really regarded as their god! When Gudleif and his men sailed away, they took the helmet and one of the Norseman's swords to be given to his relatives in Iceland.

So far as we know, nearly 500 years were to pass before Europeans set foot on Vinland's shores again.

No more were ships blown that way.

No more were explorations or settlements made.

The great Norse adventure was over.

Europe went on its way exploring and trading in other parts of the earth, but the Atlantic was not to be crossed for another 500 years!

How Do We Know All These Things?

Perhaps you were wondering as you read if this Norse story is all true. "How did you find out these things?" you ask. "Are there records, as in the story of other civilizations?"

Yes, there are records. It is true that these records cannot be relied on as absolutely as some of the others about which we have spoken; but they are fairly good records.

Why can we not rely upon them completely? The history of most of northern Europe that comes down to us from the years of the 800's to the 1100's is in the form of "sagas." These were stories that the people told of the deeds and adventures of their heroes. For a long time they were not written, but were recited — spoken by warriors and priests or by wandering singers who traveled from one great house to another.

Particularly in the long evenings of winter and more especially at banquets and other entertainments did this storytelling go on. There was also much telling of the sagas among the young men, especially the warriors and the explorers of the seas.

It was in this way that the history of the early northern European peoples was passed on from fathers to sons and mothers to daughters. It was sung, or recited, in dramatic fashion. Sometimes, of course, the singers were very much concerned to tell a good story, to win the applause of their audience. At such times it is possible that they exaggerated the events. We must remember also that no matter how hard they tried, it was not always possible for them to be exact in remembering happenings of bygone times. Stories change as they are told and retold by different people.

It is important to remember these things about the sagas, for they are the only history we have of the discovery of America by the Norsemen. The stirring events of those years were not written down until the 1100's. Today many of the sagas which have been preserved have been translated. There are many large volumes about them, and historians have studied them very carefully. What do they conclude?

While not accepting the whole story of the Norsemen in America, most of the historians think today that the general account in the sagas is true. It is known that Erik the Red did settle Greenland in 986 and that leaders like Leif the Lucky and Bjarni Herjolfsson did see and explore a land to the west of it that must have been North America.

That much we can count as history for the years from about 1000 to about 1025.

Books You Would Like To Read

ADAMS, JULIA DAVIS. The Swords of the Vikings. E. P. Dutton & Co., Inc., New York.

BOYESEN, H. H. Against Heavy Odds: A Tale of Norse Heroism. Charles Scribner's Sons, New York.

COLUM, PADRAIC. The Children of Odin. The Macmillan Company, New York.

COLUM, PADRAIC. The Voyagers: Legends and History of Atlantic Discovery. The Macmillan Company, New York.

FRENCH, ALLEN. The Story of Rolf and the Viking's Bow. Little, Brown & Company, Boston.

HALL, JENNIE. Viking Tales. Rand McNally & Company, Chicago.

MABIE, HAMILTON WRIGHT. Norse Stories Retold from the Eddas. Dodd, Mead & Company, Inc., New York.

PARTRIDGE, BELLAMY. Amundsen, the Splendid Norseman. Frederick A. Stokes Company, New York.

RIIS, J. A. Hero Tales of the Far North. The Macmillan Company, New York.

WILMOT-BUXTON, E. M. Stories of Norse Heroes, from the Eddas and Sagas. Thomas Y. Crowell Company, New York.

CHAPTER XXIII

The Europeans Explore the Earth

Did everyone in Europe begin to talk of the voyages of Erik and Leif and the other Norse discoverers? No, indeed. Most Europeans knew nothing about the great territory to the west of Greenland. This is hard for us to imagine today, when news travels so swiftly round the world, but for many, many years they knew nothing even of Greenland.

Even the map-makers of the period from 1000 to 1500 did not know it! Figure 132 shows that if they did they did not draw it on their maps. Nor did the Behaim globe, which was made in 1492, show it (figure 133). You can see Madeira, the Canary Islands, the Azores, the west coast of Africa, Iceland (Island), but the continent between them and Cipango (Japan) is not shown.

"Was there no one who had heard of these new lands?" you ask. Yes, a few, and one especially. He became a famous explorer. We shall wish to hear more about him.

Who was he? When did he live?

He was an Italian navigator and map-maker, and he lived nearly 500 years after Erik the Red.

Our Story Takes Us to Southern Europe

Before telling you about him, however, let us turn to another part of the world — to the little country of Portugal in the years of the early 1400's. Think of these years as the time when the printing press was being invented in Germany, when

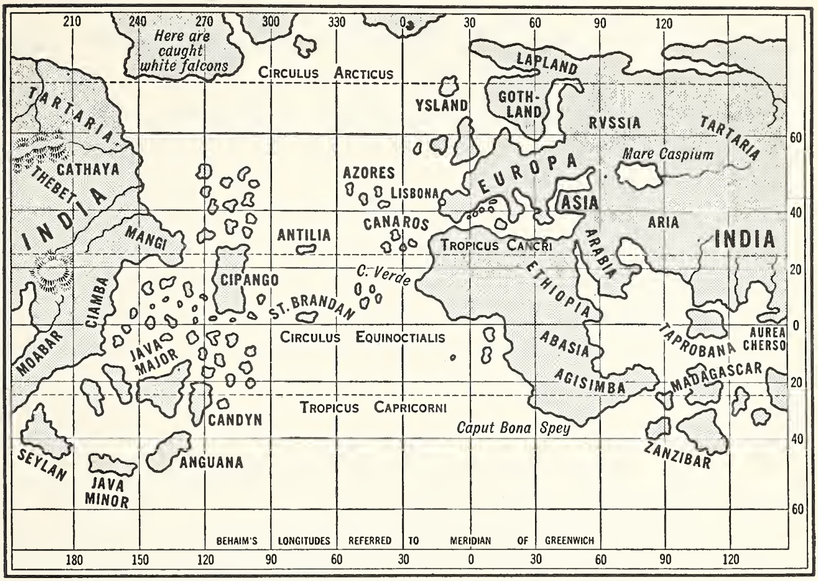


FIG. 132. A map drawn in 1492, just before Columbus sailed

the cities of Venice and Genoa were rich from the trade with "the Indies" and the "Spice Islands" of the Far East. Come in your imagination to the very western edge of the Spanish peninsula, to the little country of Portugal. In Roman times it had been called in Latin *Portus Cale*, which means "the Port to Call." From that comes Portugal, the name of the country today.

Let us see what was happening in Portugal during those years.

The Great Portuguese Explorations

"Portugal will be the greatest country on the earth," exclaimed Prince Henry (son of King John of Portugal) in 1415. "That's what my school of navigators will make it!"

"Oh, you may laugh, all of you," he added, seeing the smiles of his father's advisers. "Laugh! But you will see! Portuguese ships, sailed by Portuguese navigators, will go to India, yes, even to Cathay and Cipango around Africa! Who knows but we shall be the first to go around the earth! There is a way around, you know!"

King John's advisers did not believe it; but within 80 years after Prince Henry the Navigator had died, all that he had predicted and more had come true. The story of how he did all these things is one of the adventure tales of modern history. It is more interesting too because he himself never went on an exploring expedition.

Prince Henry's School for Navigators

How could Prince Henry know so much about faraway lands? He learned about them by starting a school. In 1415 he and his brothers had captured the Moorish city of Ceuta on the African side of the narrow Strait of Gibraltar. From the educated nobles of Ceuta he heard of the geography and the riches of Africa. They spoke of the gold and ivory on the west coast. They told of Mombasa and the other ports on the east coast into which came ships from India laden with spices and pearls, yes, even gold and rubies. Henry listened and became sure of an idea: "There's a way around Africa to India. Africa does not stretch to the south pole. Our navigators will sail Portuguese ships south and around the African coast!"

But Henry was a wise man. He knew it would require long study and much experience on the part of brave, intelligent, and strong men. So he gathered together such men at Sagres, on the very southwestern tip of Portugal. There they studied with the best geographers, the best map-makers, and the best instrument-makers of all Europe.

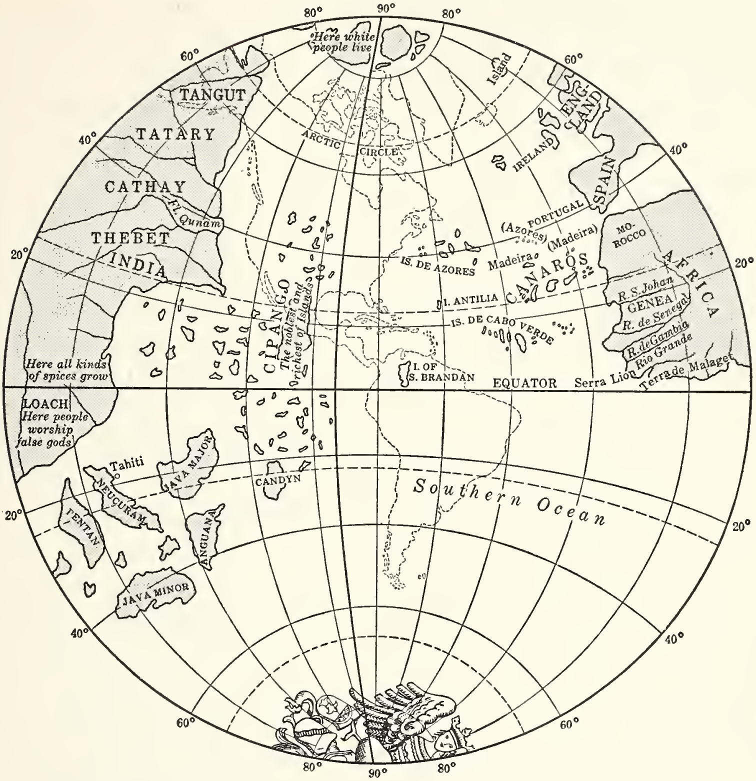


FIG. 133. A map of the globe in the time of Columbus. In 1492 a German mariner, Behaim, made a globe which is still preserved in Nuremberg. He did not know of the existence of the American continents or of the vast Pacific Ocean. It will be noticed that he places Japan (Cipango) where Mexico lies. In this reproduction many names are omitted, and the outlines of North and South America are sketched in so as to make clear the misconceptions of Columbus's time

When these young commanders of the sea were ready, Henry sent them one by one out on the Atlantic. Not to the north, where the Norsemen and British were, did they go (although he himself was the grandson of a British king), but south along the African coast. Next they traveled westward, even 800 miles out into the terrifying Atlantic Ocean. Within five years (1420) they had discovered the Madeira Islands, the Canaries (from which we get our name for the wonderful canary birds), the Azores, and the Cape Verde Islands. Year by year they dared to go farther south in their tiny boats. By 1434 the ships had reached the western cape of Africa — Bojador. Nine years later a Portuguese ship captured black natives on the coast of Guinea and brought them back to Europe. For 350 years after that time white Europeans engaged in slave trade — the buying and selling of Negroes. (We must remember, of course, that white people had long been held in slavery by other white people. The work of the Icelanders, for example, was being done by slaves from Europe. So when Negroes were made slaves, it was not considered out of the ordinary.)

The wise Prince Henry did not live to see the whole of his dream come true. But by 1460, when he died, 1800 miles of the African coast had been claimed for Portugal. Portuguese ships had nearly all the rich trade of the world, and Lisbon, the capital city, had become the center for the geographers and map-makers of Europe. Leading among these were the Italian seamen; for, as you know, the Italians had for hundreds of years been the sea-traders of the Mediterranean world.

The Columbus Brothers: World Explorers

About 1470 two brothers came to this world center of navigation. They were Bartolomeo and Cristóbal Colón, seamen and students of Genoa, Italy. In Latin their name was "Columbus," so now, of course, you recognize the name Christopher Columbus, who is called the discoverer of America.

No doubt you have read the story of Columbus's early life several times, so we shall not repeat it here. More important now is to know what the Columbus brothers did after arriving in Portugal.

In the first place, both men were engaged either in adventuring on the seas or in making maps and studying geography and mathematics on the land. Bartholomew sold his maps to the ship captains who came to Lisbon. In 1486 he joined Captain Dias on a famous trip 5000 miles along the entire west coast of Africa to the southern tip of that continent. Dias called it "Cape of Storms," for it was the roughest sea he had ever known. But the king changed the name to "Cape of Good Hope." There they had to turn back, because they were unable to round the cape. But both the seamen and the map-makers were almost certain that there was a sea route from Portugal to India.

Bartholomew and Christopher Columbus had discussed this many times, but had never agreed about which was the route to take. Bartholomew believed that ships could reach India by sailing eastward around Africa. Christopher, however, was sure that a shorter and more direct route was westward across the Atlantic. "Ptolemy's map shows it clearly," he said. "Do not all educated men agree that the earth is round?"

Toscanelli, an Italian geographer, had written to Christopher, telling him that a ship sailing west from Lisbon for only 3000 miles would reach Cipango (Japan).

In addition to studying geography Christopher Columbus spent years and years voyaging on the seas. Time after time he took long journeys far from land. Southward along the coast of Africa he went, buying and selling slaves and trading many kinds of goods. Westward he sailed to Portugal's new islands far out in the Atlantic. He even turned pirate, a fairly respectable occupation in those days, helping to rob and sink enemy ships. All this gave him many kinds of experience which were to help him later in exploring the Atlantic.

In 1477 Christopher went on a very important trip — to Iceland and the lands of the midnight sun. We do not have real proof that while there he heard the tales of the voyages of Erik the Red and Leif the Lucky and the other Norse explorers. But is it not likely that the Icelanders would tell a stranger from the south about the brave adventures of their heroes? how, 500 years earlier and time after time in the years following, Norse sailors had gone west over the Atlantic? how they had found Vinland, a pleasant if strange land of wooded river valleys and plains where corn and grapes grew plentifully? It is our belief and that of many historians that Columbus did hear such stories.

At any rate, when he returned to Portugal Columbus was surer than ever before that by sailing west you could reach Cipango and Cathay and the Spice Islands of the Indies. By the time his brother Bartholomew came back from the Cape of Good Hope nine years later (1486), Christopher was positive! All he thought of day and night was how to get ships and men to sail straight west beyond the Azores and the other islands of the Atlantic.

You remember the story in *The Building of America* of how Columbus tried for six years to get help before success came. He went to the kings of three countries, for it was the kings and their courtiers who had money to invest in such ventures. Although he himself was an Italian, he tried the king of Portugal, the king of England, and the king and queen of Spain, Ferdinand and Isabella. Notice that the navigators of those days did not care much which country's flag they sailed under, so long as they got money for ships, for supplies, and for wages to pay the sailors.

You know, of course, that Queen Isabella of Spain persuaded King Ferdinand to give Columbus the money he needed and that on April 17, 1492, the agreement was finally signed. On August 3, 1492, the "Admiral" and his three ships sailed out of Palos harbor and headed west. Eight weeks later (October 11, 1492) he landed on what is now called Watlings Island and soon after explored the other islands, known today as the West Indies — San Salvador (or Holy Savior), Hispaniola (or Little Spain), Cuba, and others. Columbus was sure he had touched the shores of the Spice Islands, near India, and the natives he found there he called "Indians." From that time to this the islands off the southeast coast of North America have been called the West Indies, and the millions of native peoples and their descendants in the two continents of America have been called Indians.

So, Again, the White Indo-Europeans Meet the Red Amerindians

Who were these half-naked, red-skinned peoples who ran up and down the island beaches at the sight of the Admiral's three ships? Were they people of India, as Columbus thought? No, we today know that they were one of the hundreds of tribes of nature peoples who were scattered over North and South America and the islands off the coast. When the Indo-Europeans arrived on their shores in 1492, there were perhaps ten million Indians altogether. All but about a half million of these lived south of the Rio Grande in the civilizations of the Aztecs, the Mayas, and the Incas. The natives of the West Indies were probably related to one of the Skraelling tribes that had fought off the Norsemen in the year 1000.[1]

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[1] You will find stories of life among the Indian tribes of North America in Chapter IV of *The Building of America.*

Columbus's Discovery Started a Rush of Transatlantic Crossings

On March 15, 1493, Columbus arrived back in Spain, having left 40 men in the West Indies. The news of his discovery was soon on every tongue. The mad Italian was right! He had found the Spice Islands, and they were located just as he had predicted — due west and only 3000 miles away! Quickly the race for the "western" trade started. Each king and his court of noblemen and merchants wanted his flag and his purse to be represented.

What a rush of explorations began and what surprises were met! Spanish explorers . . . Italian explorers under every important flag . . . Portuguese explorers . . . French explorers . . . even Swedish and Dutch explorers. Untried between 1000 and 1500, crossing the Atlantic became within a century a commonplace thing to do, even in a little open caravel 100 feet long!

Map 18 shows several of the principal new explorations that were made, and adds two of the famous "round the globe" trips.[1] In addition to the trip shown here Columbus himself crossed the ocean three more times — in 1493, in 1496, and in 1502. Not only did he touch the islands off the coast but the lands along the northern coast line of South America itself. But never could he find the riches that he wanted from the East, which he was still convinced he had discovered. After his fourth trip he remained in Spain, and died in 1506, a disappointed old man.

Other Spanish explorers learned what Columbus was never to know — that the newly discovered lands to the west were really islands off the east coast of vast unknown lands. In a letter written in 1503 another Italian, by the name of Amerigo

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[1] Good readers will find a longer story of these explorers in Rugg, *The Conquest of America*, Chapter IV.

Vespucci, claimed that he had discovered a new continent. Some years later a German geographer called the new continent "the land of Amerigo or 'America.'" That is how the new continent came to be called America.

By 1513 the West Indies had become a home base from which the Spanish sent out expeditions across the Caribbean Sea to the mainland. Soon reports came back that there were great Indian civilizations in the interior of that land. We know now that these were the Aztec Empire of Central America and the Inca Empire of Peru.

You will recall from *Peoples and Countries* and from Chapter XI of this book how the Aztecs and the Incas were conquered and enslaved in the years of the 1500's. Map 18 shows us the places where it was done and the names of the conquering Spanish captains who did it.

There was Hernando Cortes, who with 10 ships and some 600 men landed in Mexico and conquered Montezuma and his Aztec Indians in 1519 and 1520. Shortly after (1527–1537), Francisco Pizarro did the same thing to the Incas on the west coast of South America. Both Cortes and Pizarro were robbers, taking the gold and other precious things of the Indians and destroying their towns and villages.

Another decade passed. Then from 1540 to 1542 a governor of one of the new provinces of Mexico traveled through the southwestern part of our own country and claimed vast unexplored lands for Spain.

Ponce de León, another Spanish governor (of Puerto Rico), in search of a magic fountain which could change old men into youths again, explored the coast of the southern peninsula and named it *Pascua Florida*, Spanish for "Flowering Easter."

In 1513 a daring Spanish soldier named Balboa cut his way through the tropical forests of Central America and, from the top of a very high mountain, saw the Pacific Ocean.

In the 1540's, with 600 Spanish soldiers, Hernando de Soto explored Florida and other southern parts of our country. Searching for gold, they reached the great Mississippi in 1549. There within a year De Soto died, a disappointed man.

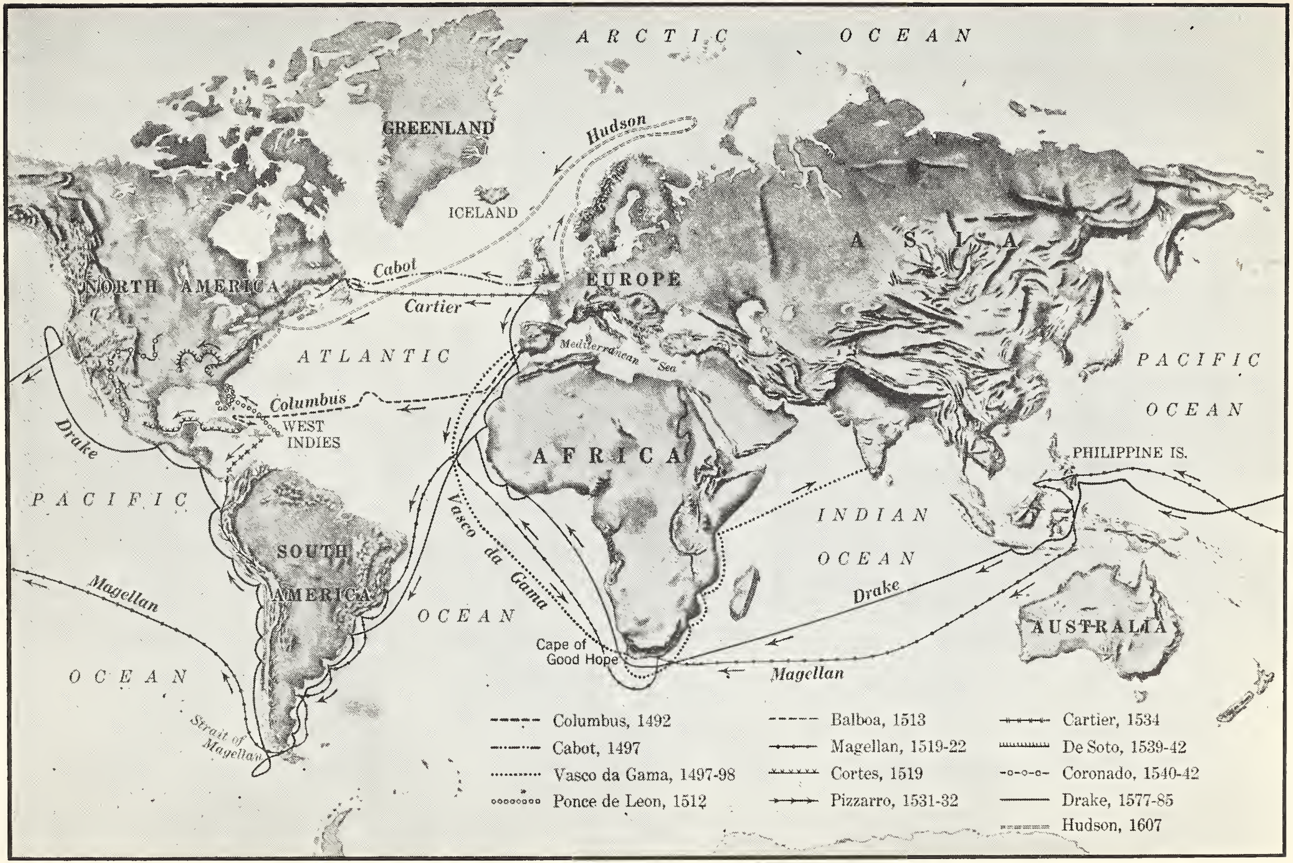
These Spaniards were indeed daring adventurers. Their hands itched for gold and silver, gems and other valuables. Nothing could stop them. On they went — robbing, burning, plundering, killing, wherever they found native towns and villages.

The Spanish were not the only ones who were exploring the New World for land and the valuables in it. England was playing her part, and France and Holland and Portugal too.

For example, King Henry VII of England sent John Cabot, an Italian navigator, to try to find a westward passage to the Far East through the unknown northern ocean. He sailed on and on, until finally he reached Nova Scotia and perhaps Labrador and Newfoundland. He claimed vast stretches of land for the English king.

Francis I of France wanted new lands and wealth too. One of the men he hired to explore and claim lands for him was Jacques Cartier. It was Cartier who discovered the St. Lawrence River and claimed large areas of near-by land for France.

Holland was in the race also. In 1609 an English sea captain named Henry Hudson, flying the flag of Holland, explored the eastern coast of North America. He felt sure that he could find a short and direct waterway through the continent which would lead him to the Far East. He discovered the river which is named for him and the harbor which the Indians who lived there called Mana-hata and we call New York. He sailed up the river to where Albany now is, but, of course, failed to find a way through the continent.



MAP 18. The Europeans explore the earth

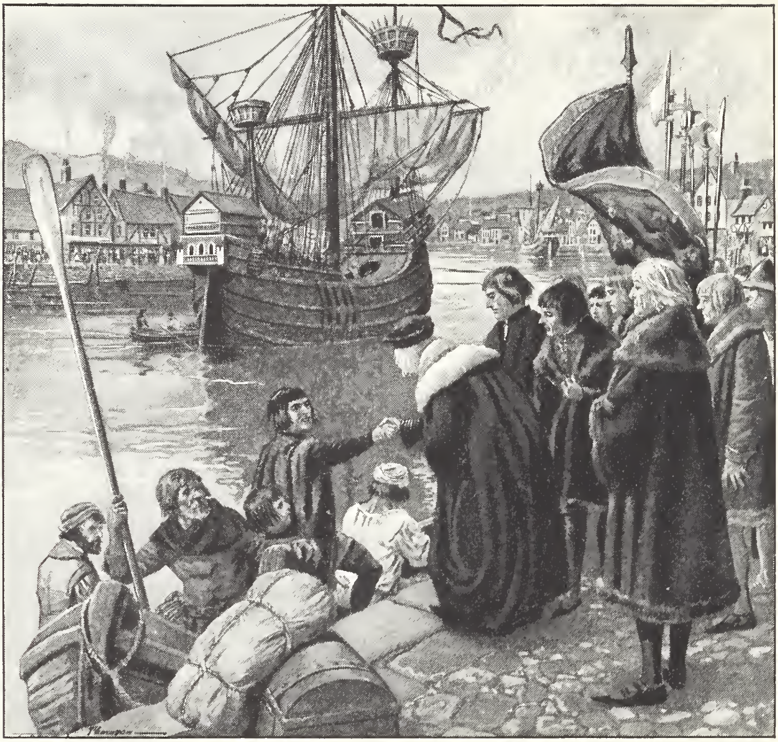


Fig. 134. The departure of the Cabots from Bristol, England, on May 2, 1497

We see, then, that the leading governments of Europe were all adventuring in the search for new lands and riches in the Americas. But one thing we must remember: they were not yet especially interested in sending people to settle down and make their homes in these faraway lands. They were sending explorers and gold-seekers, not settlers. As a result, for a whole hundred years after Columbus discovered the New World it remained almost unchanged by the Europeans.

But one very important thing these explorers did do. They gave the map-makers hundreds of new places to put on their maps. Here were new continents, new islands, new rivers, new bays, new sailing routes across the ocean!

The Portuguese Explored around Africa To Find India

Columbus's adventure for Spain increased the desire of Portugal's navigators to find the way beyond the Cape of Good Hope, at the tip end of Africa. Twelve years after Captain Dias was turned back by the terrible storms at the place where the Indian Ocean joins the Atlantic, a young navigator succeeded in going around the continent. This was Vasco da Gama, who, in spite of rebellious seamen, steered his ship into the deceiving "False Bay" and out of it again. Week after week his ship sailed eastward around the cape and northward along the unknown coast of Africa.

Gradually the seas became quieter. As the days passed, the air became warmer; they were nearing the tropics. On Christmas Day da Gama named the land on the left *Natal*, Portuguese for "Christmas." (Natal is now a part of the Union of South Africa.) They passed a huge island and then stopped at several ports on the eastern coast of Africa, Mombasa among them. Finally da Gama and his crew landed at the tropical port of Malindi and were entertained by the friendly Negro king.

It was there that the Portuguese learned that India lay only a short sail — perhaps three weeks — away.

"But how can we find our way?" they asked.

"Oh, if you wish, a guide can be sent with you. But there really is no need. The monsoon winds are just right at this season to blow your ship straight to Calicut, a city of India!" was the answer.

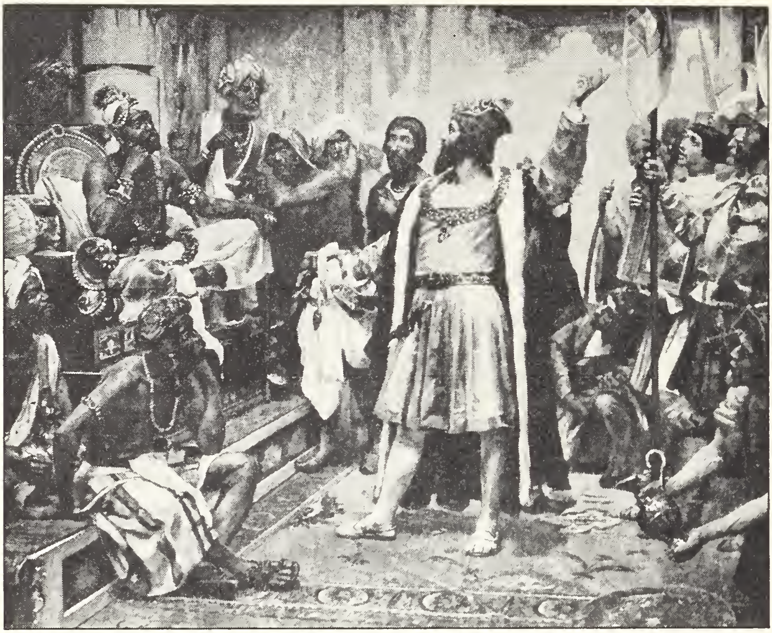


Fig. 135. After sailing around the southern tip of Africa and across the Indian Ocean, Vasco da Gama, the Portuguese explorer, arrives at the court of the king of Calicut, India. (From a painting by José Velloso Salgado)

So they set sail and, sure enough, three weeks later they sailed into Calicut harbor. This was the end of an eleven months' sail, and half of it was done over seas that no western European had ever crossed before. The eastern sea route to India was found at last.

In Calicut harbor the Far East and the Near East (and now the West) could meet in trade. Chinese junks, Malay boats, Indian crafts, Arabian ships, European ships — every kind of sailing vessel could ride at anchor side by side. And in the town itself the goods of three continents could be bought and sold. World trade at last!

That was in 1498. Is not the story of Vasco da Gama another example of the dangers men will go through for fame and wealth, especially wealth through *trade*?

The Western Europeans Begin a Race for Trade and Wealth

Vasco da Gama returned to Portugal with the marvelous news and a ship laden with spices, calico cloth (so called from the city of Calicut, where it was first bought), and other goods of the East. Almost at once the ships of other countries began to follow the path he had blazed. As the years of the 1500's passed, more and more trading fleets went out from Spain, Holland, and England, as well as Portugal, to reach India by the two-year all-sea route. Some of them never came back. Others turned back at the Cape of Good Hope. But those who did succeed came back with spices and other valuable things. These made huge fortunes for their owners.

Trade between Europe and India increased very rapidly. Records show that ships were bringing back from India such things as pepper, nutmegs, saltpeter, copper and tin, coffee, tea, green ginger, and bamboo canes. In addition there were Bengal silk, cotton yarn, and painted handkerchiefs. The people of the European countries were always eager to buy such luxuries from far-off India.

With the goods of the entire world brought to our docks in steamships from all over the globe, we can have little understanding of the craving which the British, Spanish, Portuguese, French, and other peoples of western Europe had for Eastern things. Even though the people of the Far East seemed barbarians off on the edge of the earth! Even in the 1500's the Mediterranean was still the "center of the earth," and the trading crossroads between rich Cathay and cold, bleak Nordic Europe. But now the northwestern Europeans, pioneers of trade and settlement as they had been in the centuries from 500 to the Black Death of the 1300's, began to show their adventuring spirit again.

Gentlemen Adventurers Made Piracy Respectable

In England the adventuring spirit was shown in ways other than exploring. One was by piracy — the practice of robbery on the high seas. The British jealously eyed the Spanish galleons that came back across the Atlantic loaded with the gold and silver and precious stones that had been stolen from the Indians. Stories passed about in the courts of Europe telling of the fabulous wealth carried in these ships. More than one daring young Englishman hinted at how easy it would be to capture them on the high seas and bring them to a British port. And several such young men started out to do it.

There were two English pirates who were especially feared: Sir John Hawkins and Sir Francis Drake. From the 1560's to the 1590's they were indeed busy on the high seas stealing whatever they could lay their hands on. Hawkins robbed the Portuguese of the slaves that filled their ships and sold them in the Spanish West Indies. He attacked Spanish ports and took away things of value. But Sir Francis Drake was probably the most successful and dangerous sea pirate; the Spaniards dreaded the sight of him. One by one the ships of the Spaniards were ruined by Drake's guns. They had little success in beating him off, and most of them surrendered. At one time Drake was gone from England for almost three years, and during that time he not only carried on as a pirate but also made his way clear round the world.

Gentlemen Adventurers Also Formed Trading Companies

In the late 1500's and early 1600's well-to-do gentlemen of the countries of western Europe formed companies to raise money to build and send trading ships to the East. Each country had them. The kings and nobles and wealthy bankers and business men invested in them.

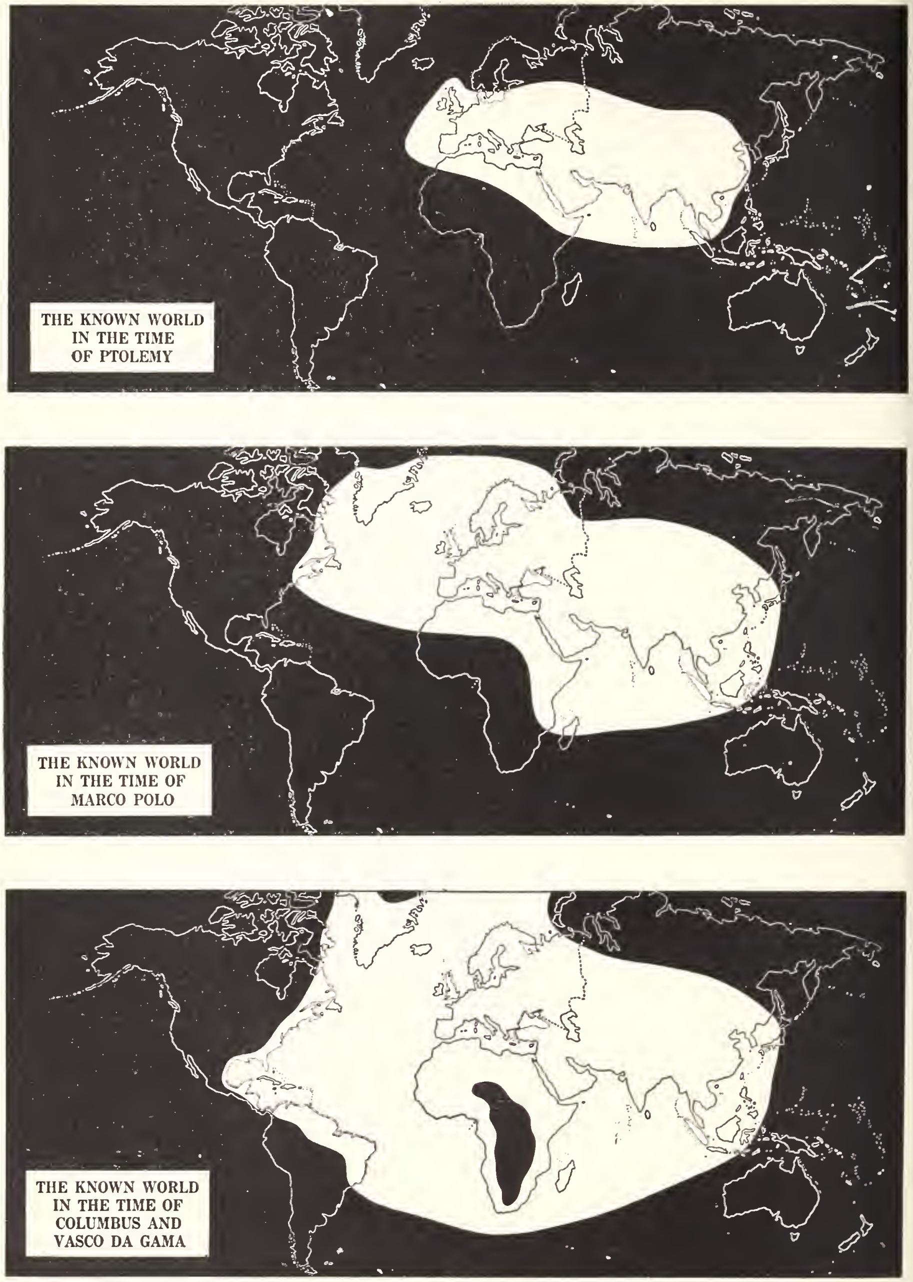
The British formed their East India Company; the Dutch, their Dutch East India Company; the Portuguese, theirs. Fiercer and fiercer became the race for trade between the European courts. Bigger and bigger became the ships.

Each country built naval ships too, and these became great rivals for mastery of the seas. Some of these naval ships were little more than pirates themselves.

How the Maps Changed!

So the years of the 1500's and early 1600's slowly passed. Steadily the ships brought back knowledge of newly discovered lands for the European map-makers. Year by year the dark unknown areas on their globes were made light, and new places were definitely marked, or "located," on them. More new countries, new islands, new peninsulas, new bays, as well as new oceans, new seas, new gulfs, and new rivers! How the maps were changed can be seen by comparing the three maps on page 458. But large areas of the earth were still unknown to Europeans. Little or nothing was known of the regions in the Arctic and Antarctic zones. Until 1769 nothing at all was known of Australia and New Zealand and many of the near-by islands of the Pacific.

The Russians of Europe had moved eastward from Moscow by 1581. By 1639 their adventuring explorers had advanced to the Pacific Ocean across Siberia and the ancient home of the Mongols.


THE KNOWN WORLD IN THE TIME OF PTOLEMY
THE KNOWN WORLD IN THE TIME OF MARCO POLO
THE KNOWN WORLD IN THE TIME OF COLUMBUS AND VASCO DA GAMA

Map 19. Growth in world knowledge (150 A.D., 1300, 1500)

The rim of Africa was known to the European map-makers after the return of Vasco da Gama in 1500; but for nearly 200 years more, little was learned about the interior. Much of that continent was still left dark on the maps made in the 1600's.

Here we must close our all-too-brief story of the amazing explorations of the western Europeans from the time of the first Norse discoveries of North America to its settlement by our ancestors in the 1600's.

Books You Would Like To Read

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CHAPTER XXIV

A Favorable Geography Prepared Europe for Industrial Civilization

Astonishing Changes after 1700

We have seen many exciting changes in the thousands of years that have passed; but they seem slow indeed when compared with what happened after 1700. It is not too much to say that between 1700 and today a whole new way of living has developed. A new kind of civilization has been built up in Europe, in America, and in other parts of the earth during the past 200 years.

Because this new civilization came about so suddenly, we call it a revolution in ways of living. If you will look up the word *revolution* in the dictionary, you will find that one of its meanings is "sudden change."

Because the new ways of living were brought about chiefly by new industries, new power, new tools and machines, we call the new civilization "industrial." So the events of the past 200 years are spoken of as "the Industrial Revolution," and our way of living today is called "industrial civilization."

As we begin the study of the civilization of modern times, we must keep in mind that changes in ways of living had previously been going on slowly. It is true, of course, that for centuries hundreds of mechanical inventions and scientific ideas had been thought up. Many improvements had come before 1700 — yes, even before 1600. But still, even in the 1700's and 1800's, the people of China and India and the Near

East, as well as all the nature peoples of the earth, went on living much as they had before. But not so with the western Europeans! During the eighteenth and nineteenth centuries they changed their whole civilization!

WHY WERE THE INDO-EUROPEANS THE FIRST TO BUILD MACHINE CIVILIZATION?

1. They Had Learned Much from Older Civilizations

How did it happen that these sudden changes came in Europe rather than in Asia or Africa or the Americas? There are two principal reasons.

The first is that before 1600 the Europeans had learned many things from the Mediterranean peoples, and from the Chinese and Indians and other Asiatics who had lived before them.

They had learned to make paper and printing presses.

They had used the Roman alphabet and developed their own languages.

They had invented measuring instruments and had improved the arithmetic and algebra, geometry and astronomy, of the ancient peoples.

They had begun trying experiments to see whether what they had always heard about the laws of nature was true.

They had learned much about the geography of the earth, and so had improved map-making.

They had made compasses and had begun to explore many new lands, thus becoming world travelers and traders.

They were builders, writers and musicians, painters and sculptors.

Thus we see that the western Europeans had the best chance to learn about, and improve upon, the advanced ways of living of the peoples who preceded them.

2. The Geography of Northern Europe Was Favorable

The second reason why the Europeans were the "chosen people" to develop the new civilization was their favorable geography. Looking back from the 1900's at what happened after 1700, we can see that everything seemed "made to order" for the northwest Europeans to build industrial civilization. Especially was this true of the geography of the region. The climate was favorable. The size and shape of the continent were favorable. The coast line was favorable.

Location in the North Temperate Zone Provided a Favorable Climate

You remember from your earlier studies[1] that the northwest Europeans lived in a very stimulating climate. Map 11 shows that the British Isles, all of Germany, Holland, Belgium, Scandinavia, and most of France are north of 45° north latitude — almost on the level of the very northern part of the United States. This location suggests cool springs and autumns, warm summers, and cold winters. This region, then, has a climate in which people can work hard.

Is the rainfall there good for growing crops? Map 11 (pages 264–265) answers that question by "Yes." In some places the annual rainfall is 60 to 80 inches; in others, only 20. The average, however, is 30 to 40 inches a year, and this is well scattered throughout the year. Therefore there is just enough rain for good crops — not too much, not too little.

Map 11 also reminds us that the Gulf Stream and the westerly winds help to give this region so far to the north a favorable climate. The westerly winds that blow over Europe pass over the Atlantic Ocean, pick up moisture on the way, and are warmed by the Gulf Stream. When they blow over Europe, they warm the lands and bring rain. The result of this warmth and rain is a long growing season.

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[1] It will be helpful to read once more Chapters XII, XIII, XIV, and XV of *Peoples and Countries*.

The Fertile European Plain: A Garden Spot of the World

If you flew today over the northern two thirds of Europe most of the time you would look down on a vast plain of cultivated farms and villages broken here and there by large towns and cities. For 1000 years, yes, for 1500 years, these lands have been tilled by peasants who have loved the soil.

There is one thing about the region that you would never forget; that is, the absence of mountains. Two thirds of all Europe is less than 1000 feet above sea level. This absence of mountains also helps to make a warm, wet climate; for the westerly winds can blow without stopping from the Atlantic straight across the continent.

Here, then, is a garden spot 3000 miles long and several hundred miles wide. Except on the arctic edge, in the north, there is not a desert in the entire continent! Maps 4 and 5 will show you that there is no other continent of which this is true.

In this wonderful plain are millions of acres of wheat and corn, of rye and barley and oats. Except for rice, all the cereals which provide the materials for the breads of the world are grown. Here also are raised potatoes and beans, peas and many other vegetables. Here the people have learned to raise sugar beets and to make sugar so as not to have to import it all the way from the sugar-cane regions of the tropics.

You can see, therefore, that on this fertile plain the climate, the lay of the land, and the soil are just right to give the five hundred million people of Europe a good supply of food.

CONDITIONS WERE FAVORABLE FOR TRADE

Trade! Trade! Trade!

Your study of history has shown you what a large part trade has played in building the civilizations of the world. One group of people can produce certain kinds of food and goods; other groups produce other kinds. They exchange what they have for what they need; that is, they trade with one another.

We see, then, how important it is for a people to live in a region which is favorable to trading. Was Europe such a region? Let us see.

The Size and Shape of the Continent

The map following page 173 shows that Europe is less than one fourth as large as Asia. It is, in fact, only a long, narrow peninsula extending out from Asia. Although it is 3000 miles long, it is very narrow. No place in it is more than 600 miles from the coast! Do you see how favorable this would be for shipping? Compare the distances to the sea from the inland cities of Europe — Vienna, Budapest, Warsaw, Prague — with the distances to the sea from Novosibirsk, Tashkent, Irkutsk, in the interior of Asia. Even in the United States the farmers and business men of such central states as Nebraska and Montana have to ship their things 1500 miles to reach a sea.

Certainly Europe was the most favored of continents in size and shape.

Were There Rivers for Transportation?

Map 11 (page 264) shows you that the Indo-Europeans were fortunate in finding such a place to live. The whole plain is cut by rivers — broad, slow-moving streams, deep enough for large vessels. Over them crops and goods can be carried cheaply down to the large cities and to seaports. There they can be loaded on ocean steamers and shipped to other countries. Over the whole area from Spain across France, Germany, and Poland as far as Russia there is a network of rivers and canals. Nature was, indeed, kind to the Indo-Europeans.

Did the Coast Line Give Europe Fine Harbors?

You have seen many times that if a people are to trade they must have deep and well-protected harbors. This means that the coast line must be indented, irregular. Has Europe such a coast line? She has, indeed! Of course not all of it is as irregular as the Norwegian coast line that we read about earlier. However, so indented is it that fifteen of the forty-two largest seaports of the earth are on little Europe's coast line!

London
Southampton
Liverpool
Newcastle
Le Havre
Rotterdam
Cherbourg
Hamburg
Marseille
Genoa
Naples
Bremen
Copenhagen
Antwerp
Piraeus

Each seaport is at the mouth of an important river, or is connected by main railroad lines with the interior. In and out of these busy ports, every day in the year, move the world's freight steamers and passenger liners (map following page 473).

Location in the Center of World Trade

Before 1500 the British Isles and Scandinavia were on the far western edge of the world. Few ships went there. Most of the vessels sailed between the ports of the Mediterranean.

But when Columbus, the Cabots, and later explorers blazed the Atlantic trail to America, they put England and the western coast of Europe right in the center of world affairs. Study the map of exploration (map 18, page 451) and map 20 of world trade to see how that became true.

But all these things might not have happened if Europe had been located far from the lands where other trading peoples lived. For example, Hobart, in Tasmania, is one of the most wonderful harbors in the world. Yet only about 50,000 people live there. Why? One reason is that it is 10,000 miles from the paths of heaviest ocean trade. All of these paths lead out from the wonderful harbors of Europe. Europe did indeed become the center of world trade!

Can you see how the age of discovery moved the center of world trade from the Mediterranean and the Near East to the northwestern part of Europe?

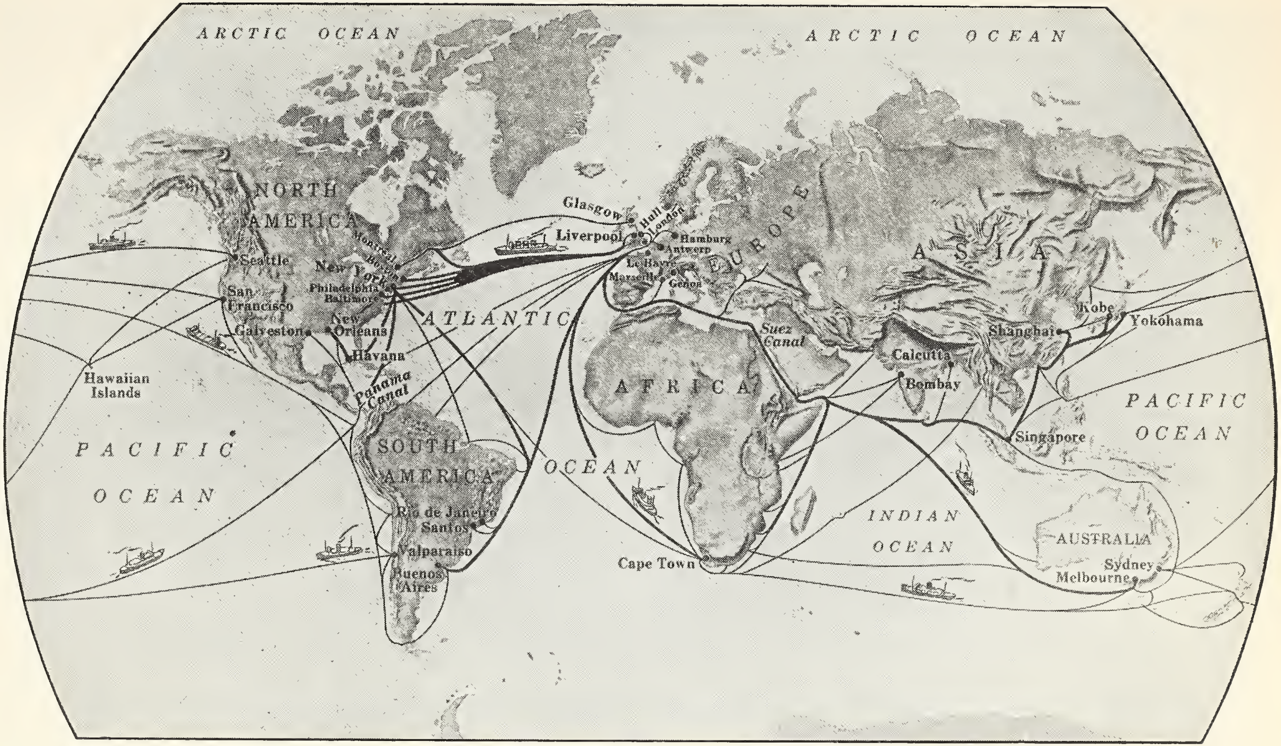
DID EUROPE HAVE THE NEEDED NATURAL RESOURCES?

What We Mean by Natural Resources

Throughout the story of civilizations we have seen many times how ways of living depended upon the natural resources which people found around them. By natural resources are meant the "gifts of nature," the things found in and on the earth. The soil is a natural resource. Forests and grasses and other vegetation are natural resources. Iron, copper, tin, and other metals are natural resources. So are coal and oil and the moving water of streams and waterfalls.

For thousands of years people of each region have depended to a large extent on what nature offered them. If they had clay banks but no forests, they built their houses of mud walls and clay bricks. In regions where there were forests they used timber for their building material. Where stone was plentiful they built of stone.

People depended upon nature for their food too. In the tropics they ate the bananas and other fruits that grew in the



MAP 20. From the fine ports of Europe ships sail to all parts of the world. This map shows you where they travel

jungles around them. In the Arctic Zone they ate the meat of the reindeer, the caribou, seals, bears, and other animals. In many places they used animal skins for clothing and even for shelter and transportation.

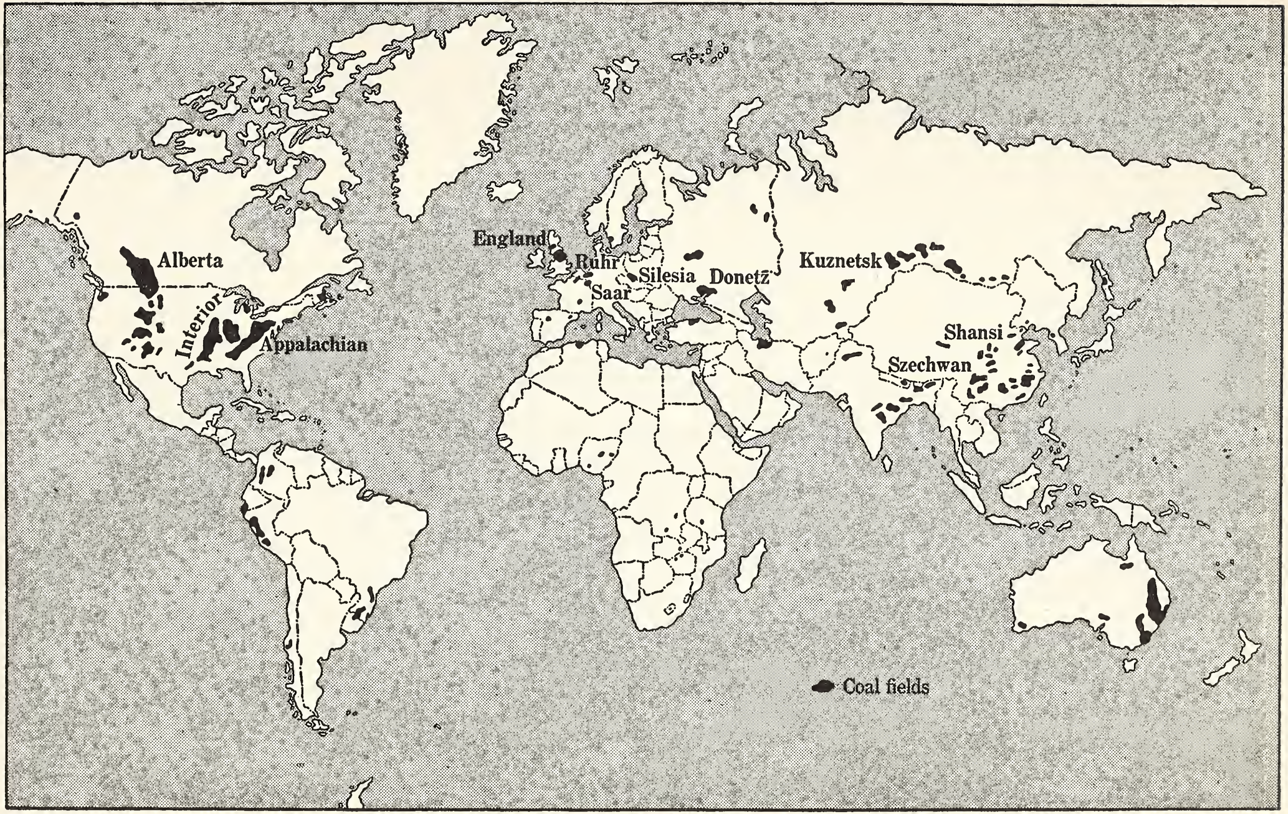
When nature did not provide people with needed resources, they either bought or took them by conquest from other peoples who had them. For example, when the Egyptians needed copper and turquoise, they sent huge expeditions to the Sinai peninsula to get them. As iron came into use about 1000 B.C. it was the lands of the Hittites in Asia Minor near the Black Sea that became important, for there iron was found. Later the Europeans sent fleets of ships and caravans of animals to the Near East and the Far East to get the spices, beautiful cloth, and other products of those regions. The Norsemen, living in barren Greenland and Iceland, sent ships far, far away, even as far as Vinland, for timber.

So the story went on. The people of each region depended at first upon the natural resources of their own region. Gradually they developed ways of traveling and trading, in order to exchange their own products for those of other regions which were necessary to their way of living.

What Resources Did Europe Need To Build an Industrial Civilization?

We have already shown that Europe was fortunate in having a vast plain of fertile soil. She was equally fortunate in having millions of acres of forests — maple, pine, oak, beech, birch, and many other kinds of trees. The grasses of her fields were just right for grazing animals.

What about the metals and fuels which were to be needed for engines and machines? Did Europe have these natural resources?



MAP 21. Coal resources of the world

Maps 21 and 22 show us that the two most important resources — *coal* to run engines and *iron* to make machines and bridges and buildings — are found in great abundance in Europe. England, for example, has enormous mines of coal. France, Spain, Germany, and Sweden have gigantic iron fields; France and Germany alone recently produced one fourth of all the world's iron.

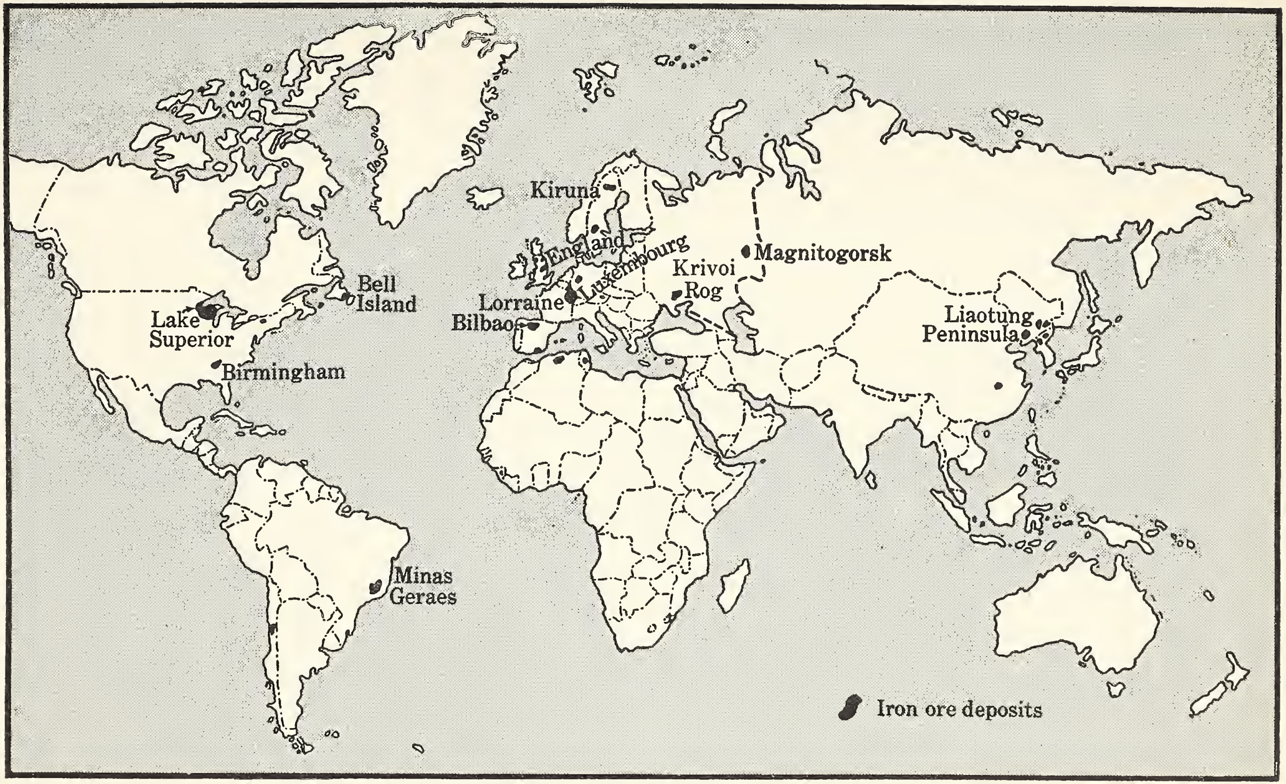
With certain other natural resources which are needed to build an engine-machine way of life Europe was only fairly well supplied. This was true of copper, tin, lead, zinc, and a long list of other metals — manganese, nickel, aluminum, and the like. For the power to run engines it had moving water. To build bridges and roads, it had the materials for making steel and concrete, stone, glass, and the like. To provide telegraph and telephone wires and such things, there were copper and other metals.

Some things, however, the continent lacked. One of these was oil; Europe had almost no oil except in the extreme eastern section. But not much oil was used until about 1900. So in the first building of industrial civilization oil was not so important. Rubber and other tropical products were not to be found because of Europe's location in a temperate zone. All such goods had to be brought there by ships or overland transportation.

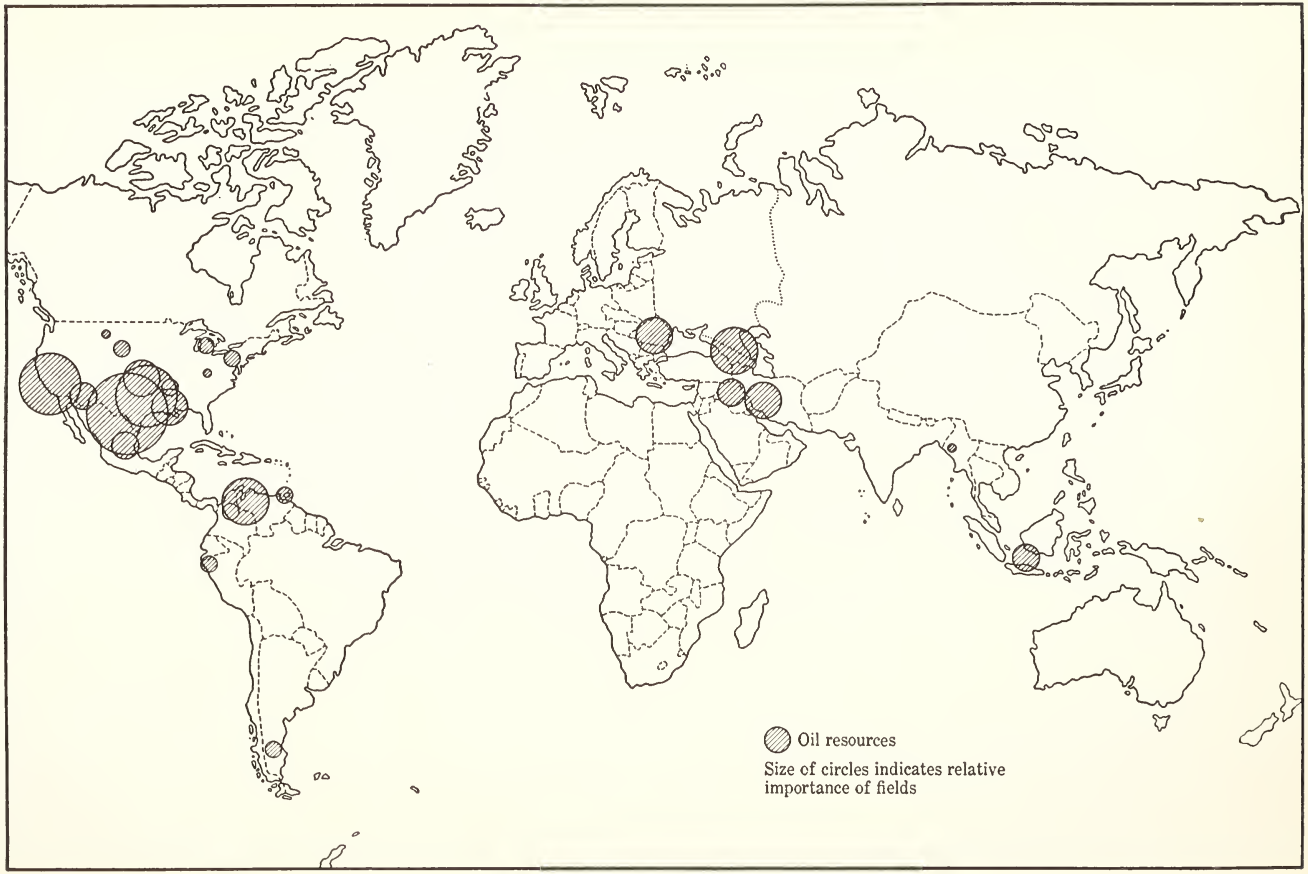
But the most necessary things Europe did have, especially good soil and forests, coal and iron.

Summing Up

Do you know, then, the two most important things that made it possible for Europe to build an engine-machine civilization after 1700? First, the geography of the continent was favorable. And second, there was the knowledge slowly piled



Map 22. Iron resources of the world



Map 23. Oil resources of the world

up by the earlier handicraft civilizations through thousands of years. The way had been prepared for it by the rise of the Indo-Europeans on the Iran plateau and their gradual settlement of Europe. The way had been prepared for it by the hundreds of years of steady invention of measuring instruments and tools. And the way was quite definitely prepared for it by the invention of simple machines.

Do you remember the long list of machines that were actually being used in Germany, Italy, France, and other countries before 1600? There were water wheels and windmills and printing presses and lathes. There were measuring instruments also — clocks and scales, compasses and telescopes and microscopes, thermometers and barometers, and the like. Some which appeared in the 1400's, 1500's, and 1600's were crude, but they were very important. The workmen were not very skillful, they did not know enough, and they lacked good tools; but they too paved the way for the wonderful things that were to come.

And so the long history of better thinking, of invention, of exploring, and of trading around the world, had made the Europeans ready for the astonishing invention and use of engines and machines that came after 1700.

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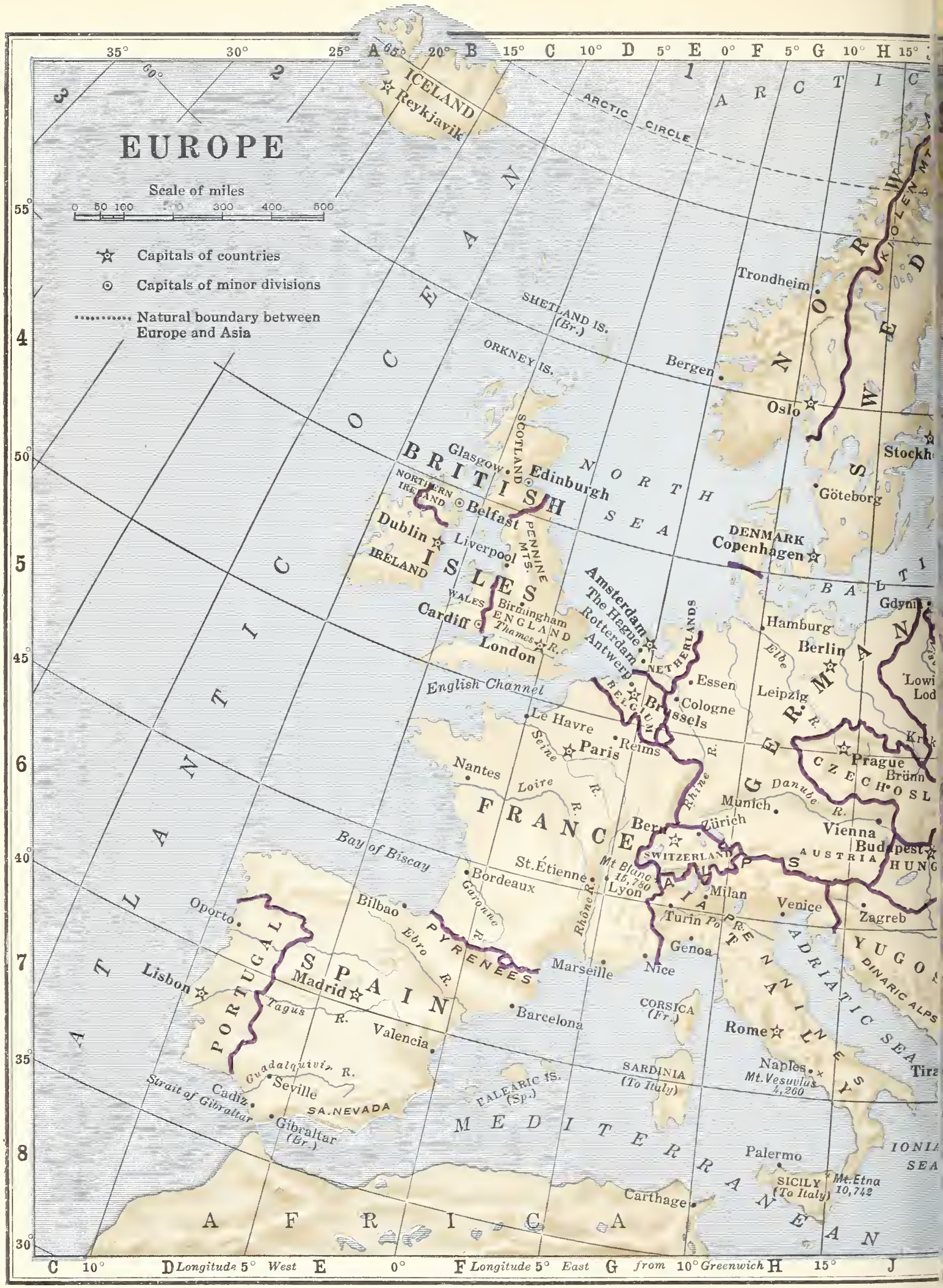
HUBERMAN, LEO. Man's Worldly Goods. Harper & Brothers, New York.

VAN CLEEF, EUGENE. Story of the Weather. D. Appleton-Century Company, Inc., New York.


EUROPE
Scale of miles
0 50 100 200 300 400 500
Capitals of countries
Capitals of minor divisions
Natural boundary between Europe and Asia
ICELAND
Reykjavik
ARCTIC CIRCLE
A R C T I C
N O R W A Y
S W E D E N
KJOLEN MTS.
Trondheim
Bergen
Oslo
Stockh
Göteborg
SHETLAND IS. (Br.)
ORKNEY IS.
N O R T H S E A
A T L A N T I C O C E A N
BRITISH ISLES
SCOTLAND
Glasgow
Edinburgh
NORTHERN IRELAND
Belfast
Dublin
IRELAND
Liverpool
PENNINE MTS.
WALES
Cardiff
Birmingham
ENGLAND
Thames R.
London
English Channel
DENMARK
Copenhagen
B A L T I
Gdynia
Hamburg
Berlin
Elbe R.
Leipzig
Essen
Cologne
Amsterdam
The Hague
Rotterdam
Antwerp
NETHERLANDS
BELGIUM
Brussels
G E R M A N Y
Lowi
Lod
Krak
Prague
Brünn
C Z E C H O S L
Le Havre
Paris
Reims
Seine R.
Nantes
Loire R.
F R A N C E
Rhine R.
Danube R.
Munich
Vienna
AUSTRIA
Budapest
HUNG
Bern
Zürich
SWITZERLAND
A L P S
Mt Blanc 15,780
Lyon
Rhône R.
St.Étienne
Bay of Biscay
Bordeaux
Garonne R.
Milan
Venice
Zagreb
Turin
Po
Genoa
Marseille
Nice
Bilbao
Ebro R.
P Y R E N E E S
Oporto
PORTUGAL
S P A I N
Madrid
Lisbon
Tagus R.
Valencia
Barcelona
Guadalquivir R.
Seville
Cadiz
Strait of Gibraltar
Gibraltar (Br.)
SA. NEVADA
BALEARIC IS. (Sp.)
CORSICA (Fr.)
SARDINIA (To Italy)
I T A L Y
A P E N N I N E S
Rome
Naples
Mt. Vesuvius 4,260
ADRIATIC SEA
YUGO
DINARIC ALPS
Tira
M E D I T E R R A N E A N
IONIA SEA
Palermo
SICILY (To Italy)
Mt. Etna 10,742
Carthage
A F R I C A
35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15°
65° 60° 55 50 45 40 35 30
A B C D E F G H J
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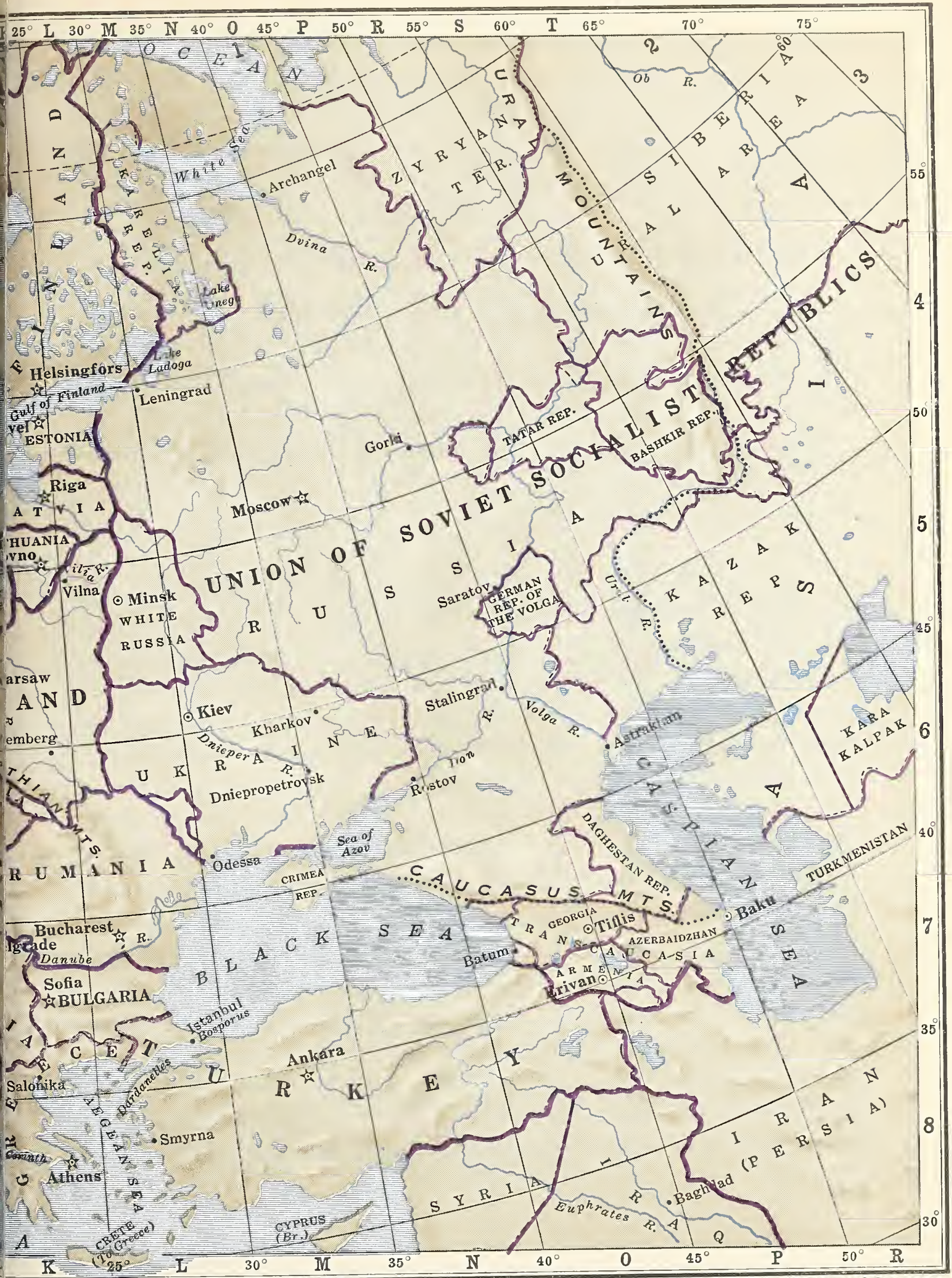
C 10° D Longitude 5° West E 0° F Longitude 5° East G from 10° Greenwich H 15° J



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CHAPTER XXV

Engines and Machines: The Industrial Revolution

You have only to look around you to know that the Europe of 1700, even of 1800, was not like the Europe of today. And yet not many more than 200 years have passed since 1700. How did those brief years bring such startling changes? We cannot tell here the whole story of the making of this new civilization, but we shall pick out a few of the important changes. Which shall they be?

What Were the Most Important Changes?

Engines and machines! Mechanical power-making and mechanical manufacturing! Those are the two things which make our ways of living today so different from those of the ancient river-valley peoples, from those of Greece and Rome, from those of Mesopotamia or Spain, from those of the Middle Ages in Europe. Machines run by engine power helped to make a new civilization.

Until after 1700 — yes, really after 1800 — human beings provided most of the power needed. The muscles in the arms and back and legs of the workman lifted and pounded the timber or stone, the clay or metal. They did the hauling and the pushing, the building up and the pulling down. Even today they supply the power for hundreds of millions of farmers and craftsmen in China, in India, in eastern Russia, in many parts of the Americas.

So from the beginning of man's life on earth he had depended on his body — hands, legs, muscles, and nerves — to produce his food, shelter, and clothing, his transportation and communication. After 1700, however, engines began to supply the power, and machines began to do the work.

Power Aids and Tools of Ancient Peoples

You know, of course, that these inventions did not happen suddenly. Power aids to help lift and move things were in use even in ancient Egypt and Mesopotamia. Of course most of those mechanical aids seem crude when compared with our machines today. The parts of windmills and water wheels, gears and water-driven ironworks, spinning wheels and sawmills, were made of wood. These did not fit together very well; for the workmen of those days had no exact measuring instruments, or "scales." There were no micrometers, such as we have today, which measure tiny lengths — hundredths of an inch or thousandths of an inch. The cutting and smoothing tools, such as drills, planes, and chisels, were also very crude. With such instruments and tools the workmen could not become very skillful; their movements were clumsy. Therefore the work was not very exact.

Even as late as the 1700's, then, there were few machines which really worked well. Nearly everything was made by hand and transported by muscle power. In the 1700's, however, came the period of sharp changes which is called the Industrial Revolution.

HOW THE INDUSTRIAL REVOLUTION CHANGED ENGLAND FIRST

The Industrial Revolution really began in England — England, which had been the "jumping-off place" for so long. In the 150 years between 1750 and 1900 so many changes took place that it would be difficult to name them all. Within that time England had ceased to be the quiet farming country it had been for hundreds of years, and became an industrial country. It became a land of factories and coal mines and steel mills and railroads and crowded manufacturing cities.

Although this change took place in an unbelievedly short time, it had its roots far in the past. Let us see something of the steps by which it came about.

Trade Helped To Bring About the Industrial Revolution in England

If you will study the map of figure 136, you will see how England must trade with the rest of the world. How can her goods be sent to other countries and how can other countries send their goods to England? There is only one possible way. Goods must be sent to and from England in ships!

Perhaps you think it is harder to carry goods by water than it is by land. For the men of the Stone Age, whose boats were rafts or canoes, it was hard to ship goods by water. But as soon as men made larger ships, it became easier. Waterways became the very best avenues of trade. You know that the Mediterranean became a center of trade and all the early civilizations grew up along rivers or by the sea.

There is another reason why heavy loads can be moved in ships more easily than they can be moved in wagons over mountains and through forests. Good roads are necessary before land transportation is easy. Thus even today, although we have good roads for trucks and railroad tracks for trains, water transportation is cheaper than land transportation. Indeed, several tons of goods can be carried by ship as cheaply as one ton by railroad.

You can see, therefore, that England could hardly keep

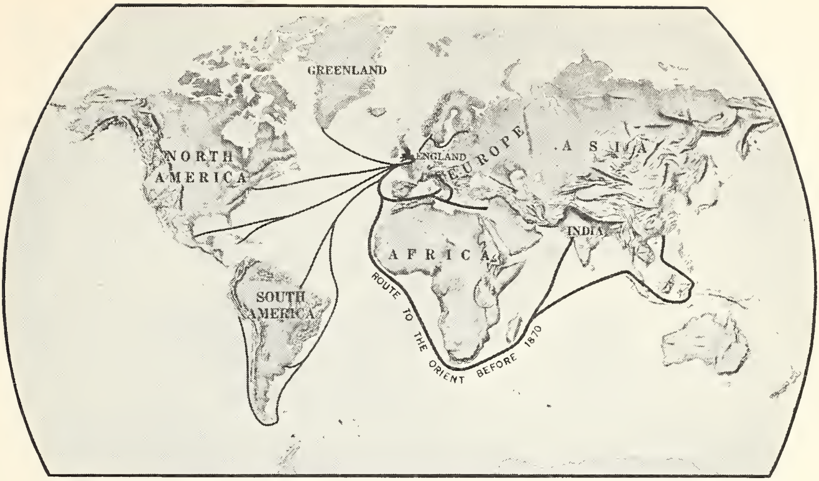


Fig. 136. England's paths of trade in 1700

from becoming a great trading country. The island was so small that goods did not have to be transported far from any part of the country to the nearest port. As figure 136 shows, from these ports her ships could follow the sea paths to all parts of the world. She was near the ports of northern Europe. She was not far from the Mediterranean. And, as sea distances go, even the coast of North America was not so very distant.

In the 1500's England was sending out trading ships along the routes her explorers had found. As the 1600's and 1700's passed, her trade grew by leaps and bounds. From North America came furs, timber, and other raw materials. From Africa there were slaves. From India and China she brought cottons, silks, spices, and gems.

Where did England get the money to buy all the things from other countries? She got it by selling goods to the peoples of foreign lands. A country which trades with other lands must produce goods which foreign peoples want to buy.

Now what other people wanted from England was manufactured goods — yarn and cloth of wool and cotton, knives and saws and other tools of metal, furniture, and pottery. So we find that, as trade grew, the English spinners and weavers, the blacksmiths and other metalworkers, the furniture-makers and potters, began to make an ever larger number of things. We find farmers becoming craftsmen, making goods not only for the English themselves but also for the people of lands far away.

Between 1600 and 1750 the exports of England increased over six times. During those years the value of goods sent out from England increased as follows:

In 1600	$10,000,000
In 1700	$34,000,000
In 1750	$63,000,000

This meant that the business men of England were taking in enormous amounts of money, much more than they could spend on their own houses, food, clothing, and entertainment.

You see, then, how location and shape helped to make England a trading center. Here was an island with many harbors, with no part of the country far from the sea, and well located to reach the rest of the world. As trade grew, manufacturing and industry grew. These helped to bring about the Industrial Revolution.

England was not the only trading nation during those centuries. Spain, Holland, and France were also centers of much handicraft and trading with other regions. Because of this fact England came into conflict with each of those countries; and in each case she won out — first with Spain, then with Holland, then with France. By 1763 England was the greatest sea power and trading nation of the world, and she has remained so up to today.

THE ENCLOSURES OF "COMMON LAND" PLAYED A PART IN BRINGING ON THE INDUSTRIAL REVOLUTION

You recall from Chapter XVIII that as the demand for wool increased, the lords began to fence in the common land for raising sheep and to shut out the farmer's cattle. There was less and less turf to be found.

A song of the time ran:

> The law locks up the man or woman
> Who steals the goose from off the common,
> But leaves the greater villain loose
> Who steals the common from the goose.

The enclosures made life so hard for the farmers that many of them sold their animals and gave up the land altogether. Many a village was left entirely deserted. Off to the towns and cities the farmers went, to learn how to work in the factories.

Thus the enclosures played a part in bringing about the Industrial Revolution.

Home Industries Increased

Of course some of the farmers remained on the land and found a new way to provide a living for themselves. Instead of going to the city to work in the factories, they began to spin and weave wool in their homes. Well-to-do traders known as clothiers would buy up wool after it had been sheared by the farmers. Then they would send it to the cottages in the countryside. There the women and children carded it and spun it into thread. Later the clothiers would collect the thread and carry it to other cottages where it was woven into cloth. When the cloth was finished, the traders would pick it up and take it to the towns and ports, from which it could be sent to far parts of the world.

The clothiers paid the people who worked in the cottages. Thus the people were really employed by them. The work took long hours and the pay was small; but at least many a poor family, unable to make a living by raising crops, could stay on its farm.

This system introduced into English life the paying of wages to workers in industry. You remember that in former days most of the craftsmen spent time first as helpers, or apprentices and journeymen. Then they became master workmen, working for themselves and making a profit on what they made. But these new workers in homes had little hope of ever doing anything beyond earning a small wage working for the clothiers. Such was the beginning of the new system.

Here and There "Factories" Appeared

Even during the 1500's, 1600's, and early 1700's business men had begun to see that it was easier and cheaper to gather the workers together in one place than to send materials out to the countryside to be made into goods. They began to build factories, where work could be carried on.

A poem published about 1579 says that

> Within one room being large and long
> There stood two hundred looms full strong.

Another description says:

> Two hundred girls were spinning. A hundred and fifty children were picking wool — "the children of the poore silly men." There were fifty shearers, eighty rowers, forty dyers, and twenty hands in the fulling mill.

Here, again, we see the beginning of something new — making things in central shops, or factories. This was to become one of the chief ways of producing things.

Coal and Iron Deposits Made the Industrial Revolution Possible

Among the oldest and most important industries of England were those connected with metals, especially iron. Ironworkers had long been making armor, weapons, tools, nails, chains, locks, and the like. In the early days the iron was smelted over charcoal fires. About 1600 Queen Elizabeth became alarmed because the forests were being cut down so fast to make charcoal, so laws were passed forbidding the cutting of more than a certain number of trees each year.

Then the ironmasters began to try out another kind of fuel for smelting iron. This was coal, that hard, shiny substance which plays such an important part in our life today. England had rich deposits of coal. There were also some iron fields which were close to the coal deposits. Everything seemed favorable to use coal in smelting iron. Several of the ironmasters tried to find ways to burn coal, but they were not very successful.

Do you remember from *Man at Work: His Industries* how Dud Dudley, who was managing his father's ironworks, began to experiment with making coal fires? For a long time he failed to make it work, but at last he was successful. As a result he could sell the pig iron which he made at a cheaper price than that of the other ironmasters. Of course the other ironmen envied him and hated him, for he hurt their business. So they opposed him in many ways, even going so far as to hire mobs to smash his forge. Because of his many troubles Dudley was unable to go very far with his work.

But his experiments did start a change in fuel; in fact, they were the beginning of a whole new chapter in the story of building industrial civilization. Within 100 years most ironmasters were using coal for their fires instead of wood.

Again do you see how geography helps to explain why people's ways of living change? In this case it was a lucky accident that England had enormous fields of good coal. It was another lucky accident that the coal and iron were found near together. These natural resources were to place England in the front rank of the countries that were beginning to do their manufacturing with machines. Modern industry has really been built on coal and iron more than on any other two things. Coal to run engines. Iron to make machines. The industries of England have grown up around the coal and iron deposits.

INVENTIONS ALSO MADE THE INDUSTRIAL REVOLUTION POSSIBLE

It was in the 1700's that several inventions were made which really launched the Industrial Revolution and changed almost all the methods of manufacturing.

First: A Workable Steam Engine at Last!

The first of these inventions was directly connected with coal. It was the steam engine.

You know, of course, what a steam engine is. We learned that when water is boiled, it becomes a gas called steam. This gas expands, filling 1644 times as much space as the water did! This expanding steam has power in it. If it is harnessed in some way, it can make things move; it can do man's work.

Over a period of 2000 years inventors had made funny kinds of engines to try to use the power in steam to move things and to work for people. Figures 137, 138, and 140 show three of these attempts. It is astonishing to think that both Heron's funny little "steam ball" and the huge Corliss engine are part of this history of the making of a steam engine.

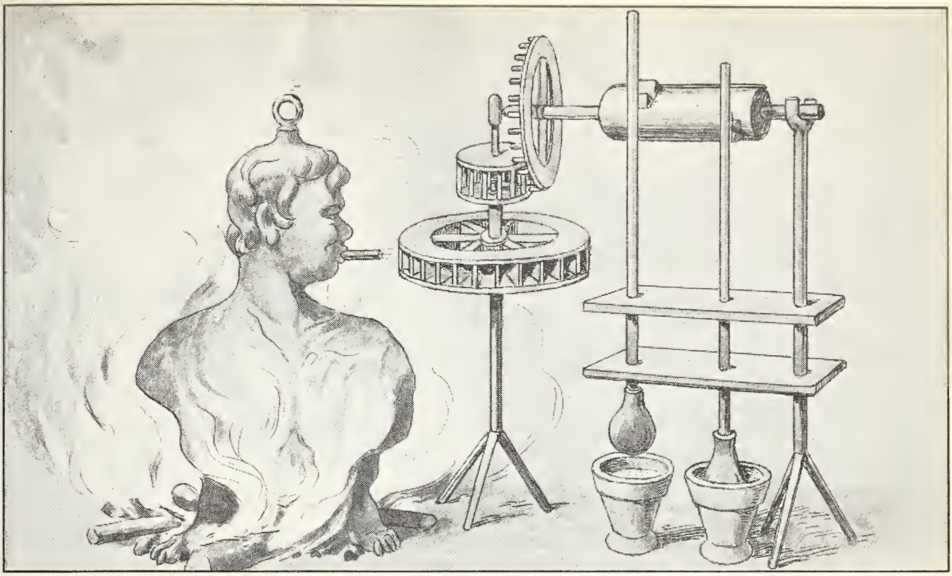


Fig. 137. Branca made this "steam toy" in the early 1600's in Italy

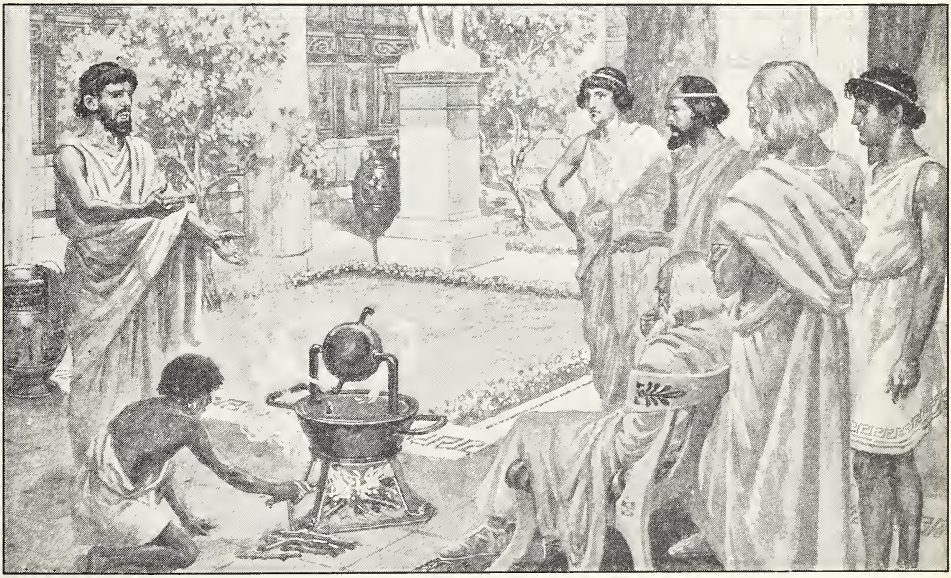


Fig. 138. Two thousand years ago the Greek scientist Heron of Alexandria made this "steam ball"

By 1705, as you know, fairly good steam pumps had been made by several inventors. Perhaps the Marquis of Worcester, Captain Thomas Savery, and Thomas Newcomen deserve the chief credit for making the best ones of their times. These first steam pumps were used largely in mines (although to some extent for other purposes) for many years.

In 1763 a Newcomen engine in the University of Glasgow, Scotland, got out of order and was sent to an instrument-maker by the name of James Watt to be repaired. Though Watt had been making instruments for astronomers and other scientists, he became very much interested in the problem of the steam engine. He believed that the engines then in use could be greatly improved.

For years Watt tried to make a better engine than Newcomen's. He thought up and tried out many new schemes. By 1769 he had a steam engine which did work better than any engine that had ever been made. It was really the first true steam engine. Within a few years it was being used to run new machinery in many industries.

The Second Kind of Inventions: Machines

During the very years that Savery and Newcomen and Watt were making steam engines, other inventive men were thinking up new machines. Surely, they thought, we can make machines which will do better work than the hoe, the plow, the shovel, the spinning wheel, and the loom. As you know, up to 1700 each tool and machine was handled by one person and was guided by his skill. Thus only small quantities of goods could be produced. If large quantities of goods were needed, it was necessary to use large numbers of workmen, each one working with a separate tool or machine.

Many business men thought, "If only better machines could be made which would do the work of many men!"

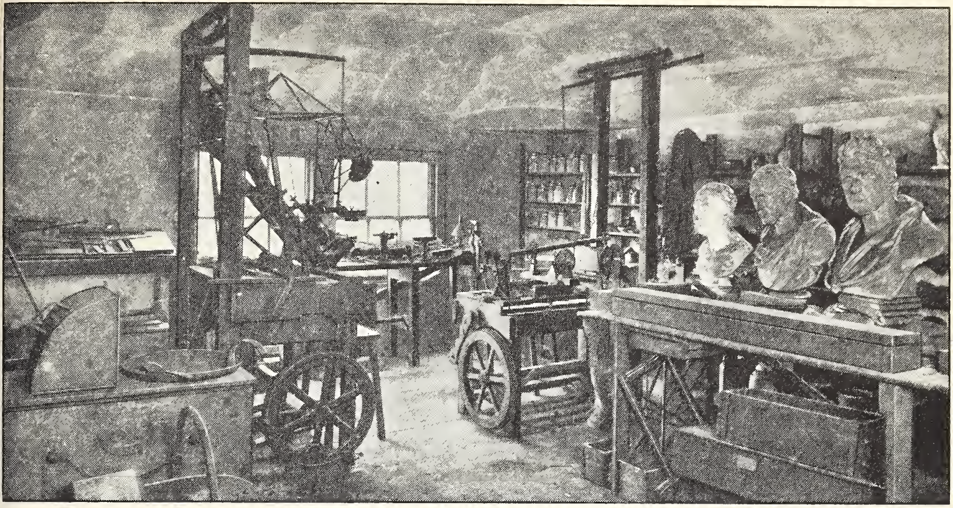


FIG. 139. The workshop where James Watt made many of his experiments

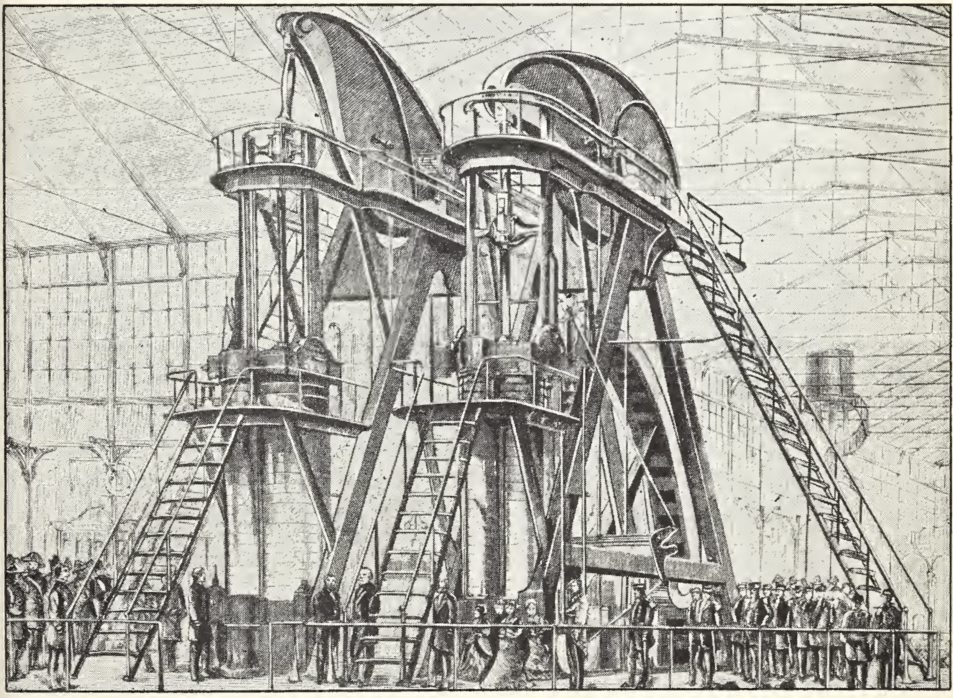


FIG. 140. By 1876 huge engines like this Corliss were being built

The First Spinning and Weaving Machines

It was in the making of cotton cloth that such inventions came first. The cotton industry was a new industry in England in the 1700's. Perhaps that is the reason why changes took place there first; for old industries, like old people, get "set" in their ways and are hard to change.

Of course spinning and weaving go back to the days of the river-valley peoples; but, century after century, work went on in much the same ways. Indeed, from Greek times to the 1700's only a few changes had been made in the ways of spinning and weaving in Europe. One of these was the change from the distaff to the spinning wheel, which was made by 1300. Both these power aids were slow and tedious, however, as was the weaving of cloth on the hand looms.

In the 1700's and 1800's all this was changed!

The first improvement came in the method of weaving. As you may know, the shuttle carries the cross thread, or woof, back and forth through the threads called the warp, which go the long way of the goods. The loom lifts up some of the threads to let the shuttle go through between them. The work of passing the shuttle through the threads each time was very slow because it was done by hand. How pleased the weavers were when the English workman John Kay invented a "flying shuttle" in 1738! This was a device by which one hand could shoot the shuttle across, either way, while the other hand and the foot each worked a different part of the loom.

When flying shuttles came into use, the spinners could not supply enough thread to keep the weavers busy. A number of men then began to work on inventions for speeding up the work of spinning thread. No one was successful until 1764, when an English spinner, named James Hargreaves, invented a kind of spinning machine which he called the "spinning jenny" after his wife Jenny. By 1767 this was in use. With it many spindles could be attached to one machine. The jennies had from eight to eleven spindles and could spin from eight to eleven times as much thread as the old spinning wheel.

In 1768 a man named Arkwright invented what was called a water frame. This was a machine which was run by water power and could do the spinning formerly done by hand. It was very successful in spinning coarse cotton threads.

Then in 1779 a man, who himself worked on a spinning jenny, invented a new machine using both the idea of the water frame and that of the jenny. This was the best machine yet invented for spinning. Even in the early days it carried from twenty to thirty spindles, doing from twenty to thirty times as much work as the old spinning wheel. Fine thread could be spun with it too. Water power was used, rather than the hand power or foot power of the workman.

And now the situation was changed! The weavers could not keep up with the spinners! Someone had to get busy and work on the improvement of looms.

In the year 1784 Dr. Edmund Cartwright was talking with some friends about spinning and weaving. They were saying that a better weaving machine could not be made, and he disagreed with them. He believed that it could. Soon afterward he set about trying to prove that he was right. And the way he invented the power loom is told in his own words:

> Some little time afterwards . . . it struck me that, as in plain weaving . . . there could only be three movements, which were to follow each other in succession, . . . there would be little difficulty in producing and repeating them. Full of these ideas, I immediately employed a carpenter and smith to carry them into effect. As soon as the machine was finished, I got a weaver to put in the warp which was of such materials as sail-cloth is usually made of. To my great delight, a piece of cloth! . . . As I had never before turned my thoughts

to anything mechanical, nor had ever seen a loom at work, you will readily suppose that my first loom was a most rude piece of machinery. . . . In short, it required the strength of two powerful men to work the machine at a slow rate, and only for a short time.

After his first invention Cartwright became more and more interested in weaving machines. At one time he had a mill with 400 looms. Some workmen, who feared that they would be out of jobs if machines came into use, set fire to the mill. Everything in it was destroyed. But Cartwright continued to invent, each time improving on the machines which had been made before.

Finally, Steam Engines Ran the New Machines

At first the spinning and weaving machines were run by water wheels as in the Arkwright invention. But in the 1780's and 1790's James Watt and his partner, a man named Bolton, manufactured and sold many steam engines. Gradually workmen got the idea of connecting the steam engines to rows of spinning and weaving machines by belts and rods and gears. Year by year more engines came into use. In the early 1800's the number grew very rapidly.

Thus in 50 years (1750–1800) big changes had come in the cotton industry. Spinning and weaving was now a machine industry, and the work was done with great speed.

And as in the cotton industry, so it came to be in other industries — in the making of metal goods, furniture, and other articles. Machines were invented and improved until they could do the work which had formerly been done by many skilled craftsmen. By 1850 most British goods were manufactured by machines.

THEN ENGINES AND MACHINES MADE RAPID TRANSPORTATION POSSIBLE

The Iron Colt; the Horseless Carriage; Liners of the Sea and the Air

During the very years that industries were changing, other inventors discovered that the steam engine could be used not only for moving the parts of machines which were standing still but also for moving vehicles. From *Man at Work: His Industries* you know the story of these inventions, from funny contraptions on wheels to the streamlined trains and motorcars and ships and airplanes of today. There were Cugnot's three-wheeled "locomotive" (1769), Richard Trevithick's "steam cart" (1801), George Stephenson's *Rocket*, and many others. These were the ancestors of the streamlined trains of today.

In England the story begins with Richard Trevithick's "Catch-me-who-can!" (1801). But it was an engineer named George Stephenson who is regarded as the great locomotive-builder of that day. In 1825 a twelve-mile track was laid between the towns of Stockton and Darlington in England. On it horse-drawn cars were to be used; but Stephenson was so eager to try his new engine called *Locomotion* that he went to the directors to talk the matter over. After much discussion he succeeded in getting them to try his engine. It worked, too! In fact, it pulled a long train of cars — some filled with people and others with coal and other freight — at the speed of fifteen miles an hour!

Five years later (1830) a railroad between Manchester, the cotton-manufacturing center, and Liverpool, the chief port of the western coast of England, was opened. Every day six trains drawn by locomotives designed by Stephenson ran from one city to the other at the rate of eighteen miles an hour.

Such were the beginnings of the transportation system which today crisscrosses England and all other industrial countries. The engines got bigger and better; the rails, made first of iron and later of steel, became heavier and smoother; the cars became finer.

In all countries today trains run between the cities and towns. They carry people and goods at 50, 70, yes, 80 and more miles per hour. So the "iron colt" of 1800 has become the "steel race horse" of today.

The story of other means of transportation is much the same. The first crude steam carts of the 1700's became the motorbusses and automobiles of today. The little viking sailing ships of 900 were followed by the galleons and caravels of 1500, and then the clipper ships of 1850. Later, engines were put into them. No longer did the ship captains depend on the power of the wind. Finally the sailing ships disappeared almost entirely from the oceans, and the great liners of today took their places (figures 143 and 144).

So also the flying machine was invented, changed, and improved. Leonardo da Vinci's idea of a machine which could sail through the air came true. Today airplanes, carrying people and mail, fly on regular schedules. Air liners of today cross the oceans and continents in a few hours!

England, the Home of the Industrial Revolution

So it was that the steam engine, invented in England, helped to bring about a revolution in transportation as well as in manufacturing. There on the "tight little island" were taken the first steps in the change which was later to transform the world. There the first important industrial civilization was born.

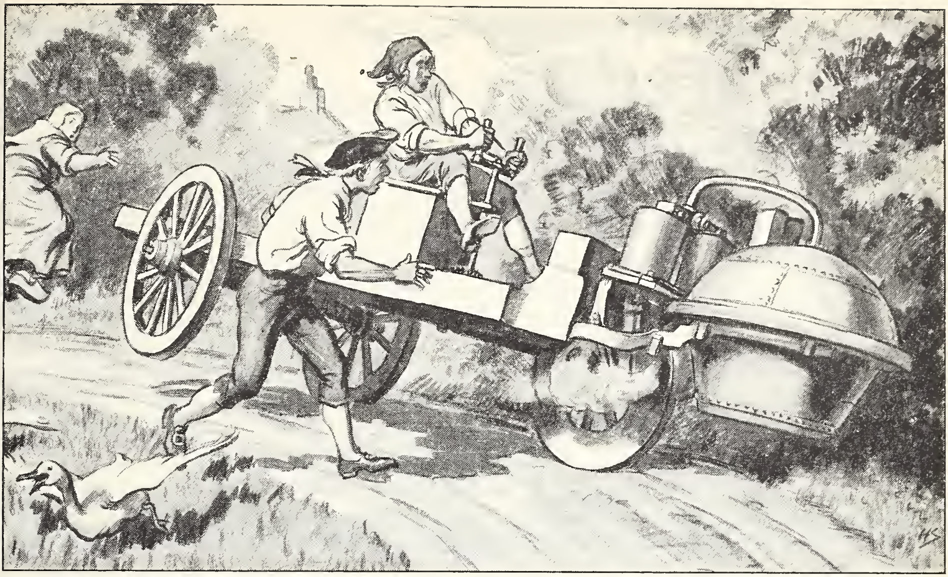


FIG. 141. Curves were sometimes too much for Cugnot's three-wheeled locomotive

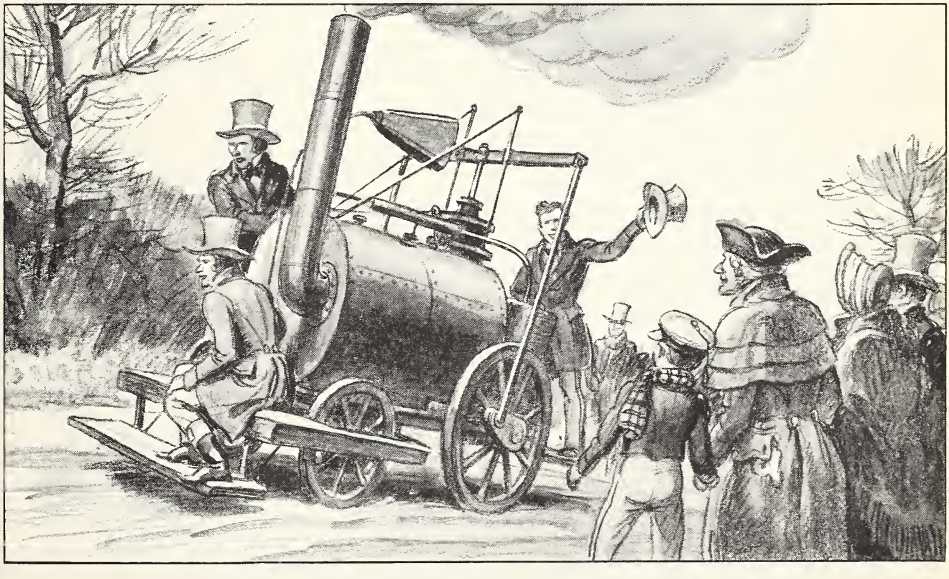


FIG. 142. Richard Trevithick driving his steam locomotive in 1801

Other Countries Also Had Their Industrial Revolutions

The use of machines in manufacturing and transportation came a little later in the United States, France, Germany, and Japan than in England. But it came in them too. Before the World War these were the four important industrial countries. Of course they were not by any means the only countries which had many industries. But they, with England, were the chief industrial countries. In *Our Country and Our People* we shall study more fully how the Industrial Revolution took place in the United States. In *Changing Countries and Changing Peoples* we shall see the same story for the other manufacturing nations. Here we shall give only an outline of it all.

1. *In the United States*

The United States followed close upon England's heels in the making of engines and machines. Until 1776 the thirteen colonies along the eastern seaboard of North America had belonged to England. English craftsmen had been among the early settlers. These colonists carried on their early crafts and industries much as the English people back at home did.

But then came the Revolutionary War between America and England. The colonies no longer belonged to England; they became the United States of America, a "foreign country." This made a big difference to England. Her merchants, who owned the factories, were important in the English government, and they saw to it that laws were passed to prevent their inventions from being taken to America or to other countries. They were afraid that machine-manufacturing in the United States, France, and other European states would grow and take away their trade and profits. They wanted, naturally enough, to keep the manufacturing and trade for themselves.

But it was impossible to keep knowledge from traveling,

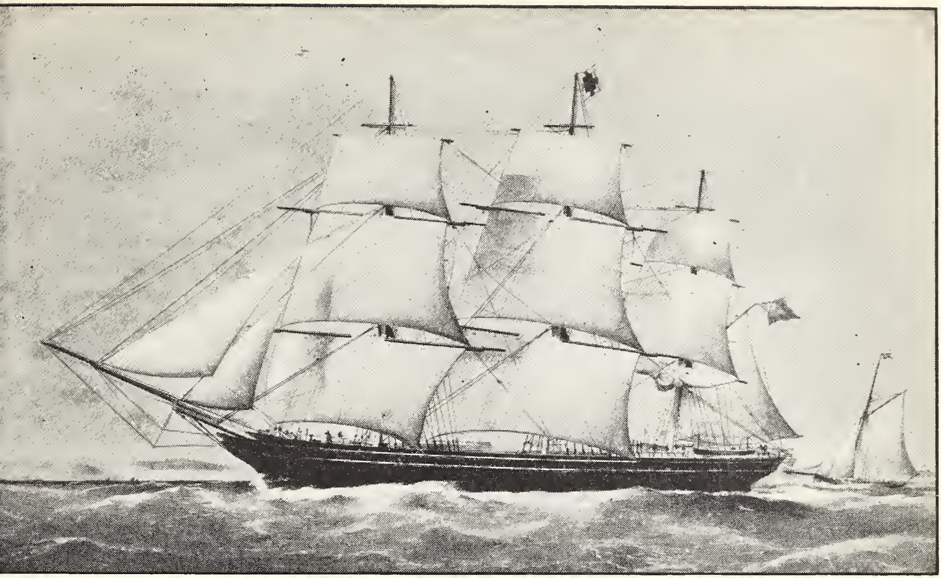
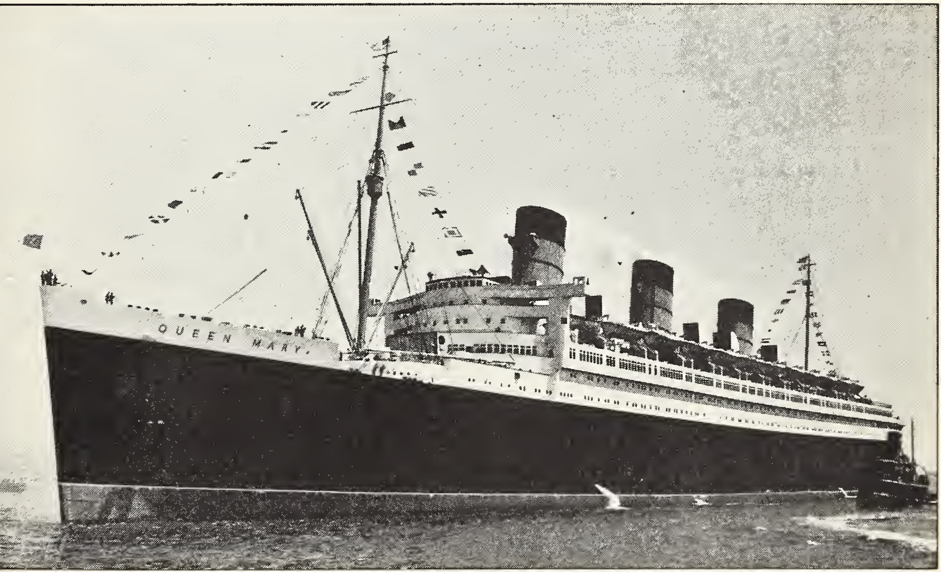


Fig. 143. Clipper ships, like the Walmer Castle, sailed under the American and British flags



Armstrong Roberts

Fig. 144. On all the seven seas the great liners of today are seen

and one way and another the knowledge of how to make machines spread abroad. For example, a weaver by the name of Samuel Slater came from England to the United States in 1790. He knew the English spinning and weaving machines so well that he was able to build them from memory. Within a few years he and his partners had a cotton mill in Pawtucket, Rhode Island, like those in England.

The same thing happened with other machines. Copies of those in England were made. New ones were invented. During the early 1800's factories sprang up, industrial cities grew, new railroad lines were built, coal mines were dug. But the details of the many changes that occurred in America we must leave for the later book, *Our Country and Our People.* We just want you to see here that the United States followed England in the path of using engines and machines to do man's work.

2. *In France*

The same thing happened in France, although somewhat later. Geography helped to develop her trade and manufacturing as it had helped in England.

On the map following page 473 find France. Has France any of the advantages which have made England an important manufacturing and trading center? Do you see that she has a long coast line facing England and the Atlantic Ocean? and another on the Mediterranean? Are not these coast lines, like those of England, well supplied with good harbors? Do you see also that she lies in the great trading pathway between eastern and western Europe? Truly, does she not seem well located to be a trading nation?

Even in the 1700's France was carrying on a large trade with the far parts of the world. But before 1830 she had few machine factories. There were a few big cities, but France was still largely a land of farms and farmers.

France was 50 years and more behind England in taking up machine-manufacturing. Slowly, however, she did begin to use engines and machines. About 1825 the first machines were brought over from England. After 1850 factory-building, railroads, and road construction proceeded more rapidly. Along with these came the growth of towns and cities and a vast increase of trade, as in England.

Even today, however, France is more of an agricultural country than England. She has had fewer "heavy" industries, such as coal-mining and iron-smelting. She has more of what we call "light" industries. France produces many of the world's luxuries, such as fine silks, jewelry, and perfume.

So much for France now. In *Changing Countries and Changing Peoples* we shall read fully the story of how she became an industrial country.

3. *In Germany*

As for Germany, the Industrial Revolution did not really reach her until almost 1870. Before that time she was composed of hundreds of little quarreling states and kingdoms. By 1870 she was united into one large and powerful country. Once united, she made almost unheard-of leaps forward in machine-manufacturing, transportation, and trade. She had plenty of coal and iron. That is one reason why even by 1870 she was producing more coal and iron than France. She was still far behind England; but within the next years she made long strides forward. Rapidly she dropped her old-fashioned ways of making things.

Within a few years her iron and steel industries, her woolen and silk industries, her chemical industries, her electrical industries, and others took their place among the most important in the world.

At the same time many of her farmers became industrial workers, and her industrial towns and cities began to grow. Railroads were built to connect these communities. Her trade with other peoples around the entire earth increased.

So we see that in each industrial country — in the United States, in France, and in Japan too — the story of the Industrial Revolution is much the same.

And So It Was that Europe and America Became the Centers of a New Kind of Civilization

Thus Europe, particularly northern Europe, changed during the 1800's from a quiet agricultural region into a whirring, dirty, crowded industrial land. So did the United States. Thousands of factories took the place of farmhouses. Manufacturing cities grew up where green grassy fields had been before.

The life of hundreds of millions of people — even those left on the farms — was changed. The new civilization was different from any that had gone before. Different from that of Egypt. Different from that of China, of India, of Greece and Rome. Different, very different, even from that of the Europe of 1600, out of which it grew. In some ways it was better; in some ways, worse.

We cannot tell here the whole story of the rise and nature of this industrial civilization. As we go on with the work of the coming years we shall understand it more and more.

But some things about it we shall study now: The chief ways it changed the work of mankind. The ways it changed villages and towns. How it changed the way people think and the way they feel. We shall also see how this new European industrial civilization spread out and out to all the far lands of the earth, leaving very few untouched. At least this much of the fascinating story we shall have a glimpse of in the remaining chapters of this book.

Books You Would Like To Read

BROOKS, E. C. Story of Cotton. Rand McNally & Company, Chicago.

HARTMAN, GERTRUDE. The World We Live In and How It Came To Be. The Macmillan Company, New York.

HODGINS, ERIC, and MAGOUN, FREDERICK. Behemoth, the Story of Power. Doubleday, Doran & Company, Inc., Garden City, New York.

HODGINS, ERIC P., and MAGOUN, FREDERICK A. Sky High; A History of Aviation. Little, Brown & Company, Boston.

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CHAPTER XXVI

The Europeans Conquer and Settle the Earth, 1500

Some Sharp Contrasts

In 1500

In 1500 there were no European settlements in North or South America, in central or southern Africa, or in Asia or Australia. Nor were there any on the islands of the oceans, except Iceland and a few near the European coast.

In that year Europe itself had only a few million busy people, mostly farmers and handicraftsmen. Most of the people in the few cities and towns made their living by making things with their hands and by buying and selling.

Even after 1000 years of settlement by the tribes that came into the Roman Empire, only six European peoples had formed "countries" — the English, the Spanish, the Portuguese, the French, the Dutch, and the Russians.

Today

There are 74 established countries on the earth today.

Twenty-nine of these are in Europe, and are 400 . . . 500 . . . 600 years old.

In North and South America there are 22 "new" countries, all conquered or settled by Europeans — mostly by British, French, Spanish, or Portuguese pioneers.

In South Africa there is one "new" country (the Union of South Africa), also conquered and settled by Europeans — the Dutch and the British.

Australia and New Zealand are two "new" countries settled by the British.

In Asia there are ancient cities rapidly being made over into "European" ones.

In these 25 new countries live nearly 300,000,000 human beings. Every race and every nation on the earth have sent people to help to build them. To this day most of the inhabitants are from one or more of the six great settling countries.

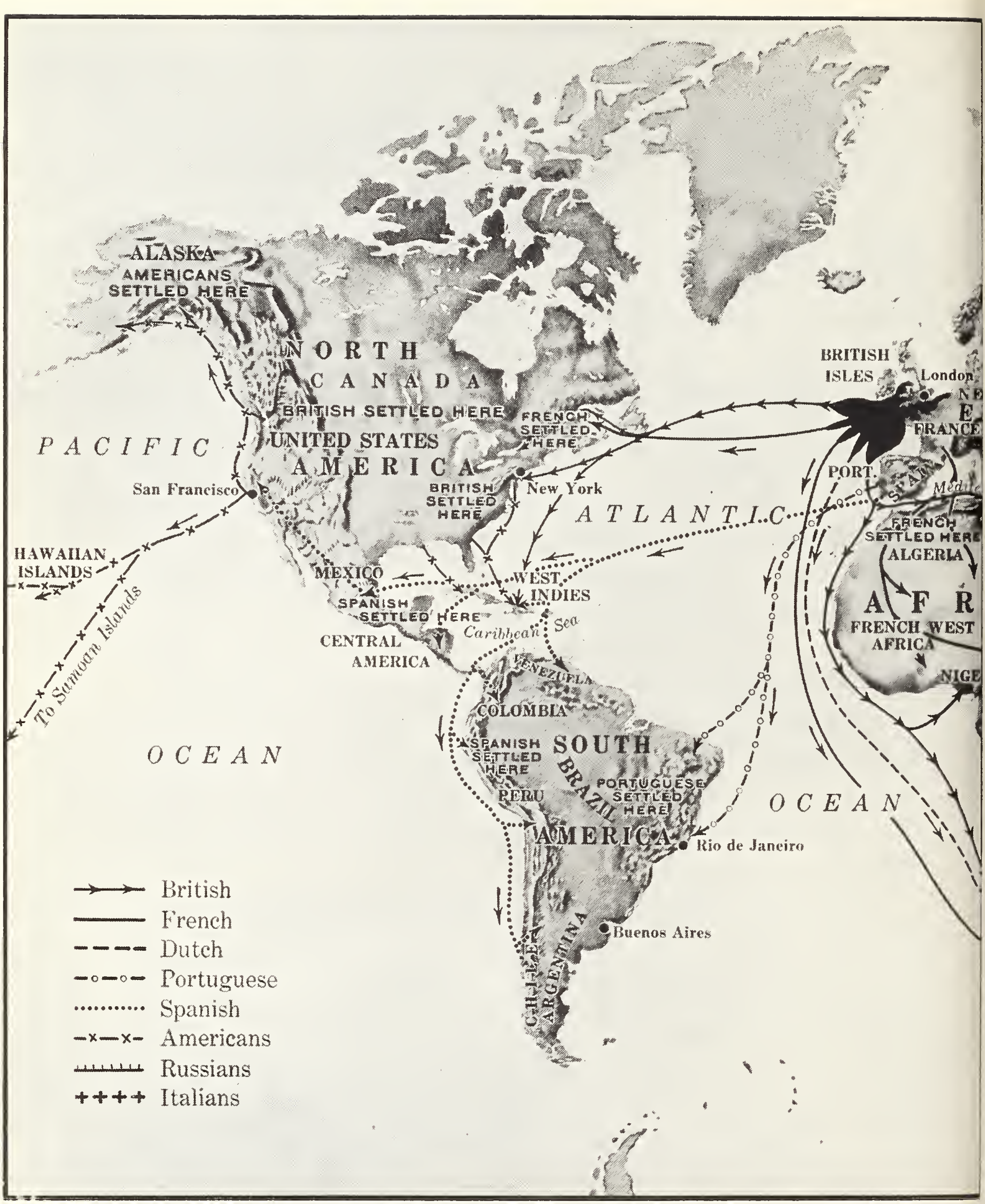
Throughout these statements two ideas particularly stand out: "settled by Europeans" . . . "conquered by Europeans."

This conquering and settling was done chiefly by the six European peoples who, by 1500, had developed fairly strong countries with national governments. These were England (later Great Britain), Spain, Portugal, Holland, France, and Russia. It was these peoples who, after 1500, carried on the world's greatest movement of large populations.

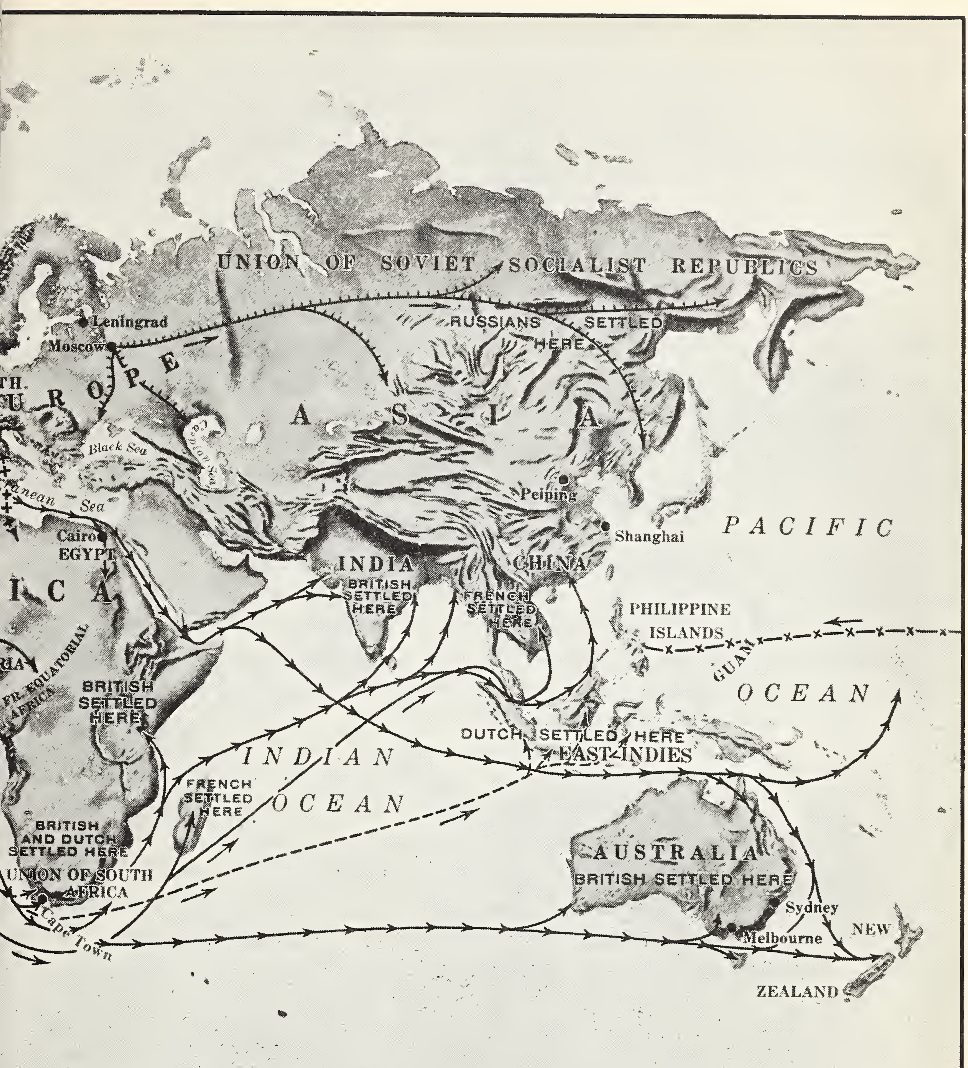
THE GREATEST HUMAN MIGRATION OF ALL HISTORY

Map 25 is one of the most important maps we have put in the volumes of Man and His Changing Society. In future studies we shall refer to it again and again, for it sums up on two pages the story of the greatest moving of peoples in the history of the world.

As you have seen in earlier books and in chapters of this volume, human beings have always been on the move. They settle in a place, build a home, stay a while, then "pick up and move on." The river valleys were settled that way, perhaps 8000 or 10,000 years ago. That is the way Europe itself was settled: people came in from Asia and Africa, perhaps 4000 years ago. In the islands of the Pacific the same thing happened. In the same manner Europeans settled Iceland, Greenland, and other islands in the Atlantic.



Map 25. Exploration and



settlement of the world

But each of these "migrations" (as the movements of people from one region to another are called) was done by families, clans, and tribes wandering slowly from place to place, most of it overland. Each migration had really been a small affair, at the most a few tens of thousands of people on the move at one time.

The picking up and moving on of the Europeans after 1500 was very different. Whole villages were emptied. Millions of peoples left their homelands and crossed the great oceans of the earth to build entirely new homes far away. Let us study a few examples briefly to see how it was done.

THE PRINCIPAL SETTLEMENTS

The British Settle Five New Countries

1. *The British Settle the United States*

In *The Building of America* you read many stories of the settlement of our own country.[1] You saw thousands of English, Scotch, and Irish farm families, having been squeezed off their own land by the enclosures of the lords, pack up and sail with their neighbors to Massachusetts, on the New England coast. You saw well-to-do British merchants and small landowners who had become discontented with the English king and Church sell their belongings and move. You traveled with them as they crossed the Atlantic. You saw them land in America and stake out their new homesteads in Massachusetts, New York, Virginia, and the Carolinas. You saw Captain Myles Standish and William Bradford at Plymouth, Mr. John Winthrop and his neighbors at Boston, Captain John Smith and company at Jamestown, and many others. Such brave Britishers as these settled the thirteen little American colonies from Maine to Georgia. They brought British ways of living with them.

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[1] In *Our Country and Our People* and in *The Conquest of America* we shall study this very carefully.

A century and a half later their great-great-grandsons defeated the soldiers of the British king, George, in the War of the Revolution. As a result the thirteen colonies became the thirteen states of a new country, the United States of America. General George Washington was its first president.

And then another important part of the Great Migration started. In the hundred years between 1820 and 1920 some 33,000,000 Europeans — 15,000,000 of them from the southern and eastern parts of the continent — crossed the ocean and helped to settle North America all the way from the Atlantic to the Pacific. By 1900 all the land — 3,000,000 square miles — had been staked out by new settlers.

While this was happening hundreds of thousands of Negroes, who had been captured by white traders in Africa, were sold in America as slaves. Today the United States has 130,000,000 people, of whom about 13,000,000 are black. But the ancestors of most Americans are "northwest Europeans," that is, British, Irish, Scandinavians, Germans, and the like.

2. *The British Settle Canada*

During the very same period hundreds of thousands of other Britishers, together with many Frenchmen, settled the new country to the north of us, called Canada. Canada (3,694,863 square miles) is larger than the United States, and today it has a population of 10,376,786, of whom 2,927,990 are French.

3. *The British and the Dutch in South Africa*

While some western Europeans were settling the Americas, others were staking out homesteads at the far-southern end of Africa. The Union of South Africa, one of the newest countries of the earth, is the result.

The first to go there were Dutch colonists. They left their homes in Holland to settle in "the Cape" in 1652. Throughout the 1700's Dutch people went to South Africa by the hundreds of thousands. Small bands of Frenchmen, Germans, Englishmen, and Scotchmen joined them also, and slowly homes were built on the lands along the southern coast. The Negroes who had lived there for no one knows how long opposed their coming. Between 1779 and 1818 five Kaffir wars were fought with them. But the European guns were too much for the spears of the Negroes. Year by year more and more land fell into the hands of the whites.

During the years from 1780 to 1830 the British seized control of this Cape colony from the Dutch. More and more English and Scotch settlers went out there to make their homes. As they increased in numbers they built roads and started schools and colleges. Thus they laid a firm foundation for another new British civilization.

Then followed 70 years of settlement to the northward by thousands of discontented Boers (Dutch farmers) who were unwilling to live under the British laws. This movement began in 1836 and resulted in the establishment of the South African Republic, which, after 1900, became the Transvaal. As the "Afrikander," or Boer, farmers moved northward to build new homes they met and fought war after war with the native Negro tribes. Always the modern guns won out; always the natives were pushed back.

But the British were not content to leave the northland to the Boers. Year after year they sent their own trail-blazers and homesteaders northward into the interior. Gradually they came in and surrounded the lands of the Dutch Boers.

Then, in the 1860's and 1870's, came the discovery of Africa's richest gold and diamond deposits, and the whole course of South-African development was changed. The climax came in

1886, when an enormous gold deposit was found at the Witwatersrand. A great gold rush began. Johannesburg became a boom town overnight; within a few years it was a bustling British city. Again the British empire-builders and Jewish business men were cleverer than the Dutch; they secured control of the mining industry.

At this time it was the hope of Cecil Rhodes and other British in Africa that they would conquer all the continent for Great Britain. But as they moved northward they came into conflict with the Boers, under "Oom Paul" (Uncle Paul) Kruger. Finally open warfare between them broke out in 1899. Trained troops came from Britain, and after three years defeated the Boers. Great Britain now had control over the Dutch lands.

In 1910 the Parliament in England joined the four British provinces (Cape of Good Hope, Natal, Orange Free State, and the Transvaal) into the "Union of South Africa." Today this is a dominion of the British Commonwealth of Nations. It is practically an independent country, however; for three fifths of the people there are Dutch Boers, and they really control the government.

4. *New Zealand: "More British than the British"*

It seems that there were no distances too great for the Europeans to travel in search of new land, new homes, new businesses, new trade. The settling of New Zealand, 13,000 miles from England, is a good example. In the years from 1792 to 1840 a few daring adventurers from England and America were making fortunes by whaling and sealing in the waters around New Zealand. Others were getting rich through trade in timber. As time passed, small companies of Scots and Englishmen started colonies there, and these grew slowly but steadily. By 1850 there were six separate British settlements on the two islands of New Zealand. These were inhabited by a few thousand people who were making their living by raising sheep and cattle.

Then, following the discovery of a gold field in 1857, there was a gold rush to New Zealand. This boom was short-lived, however. By the late 1860's it was over, and the people again turned to raising sheep and cattle.

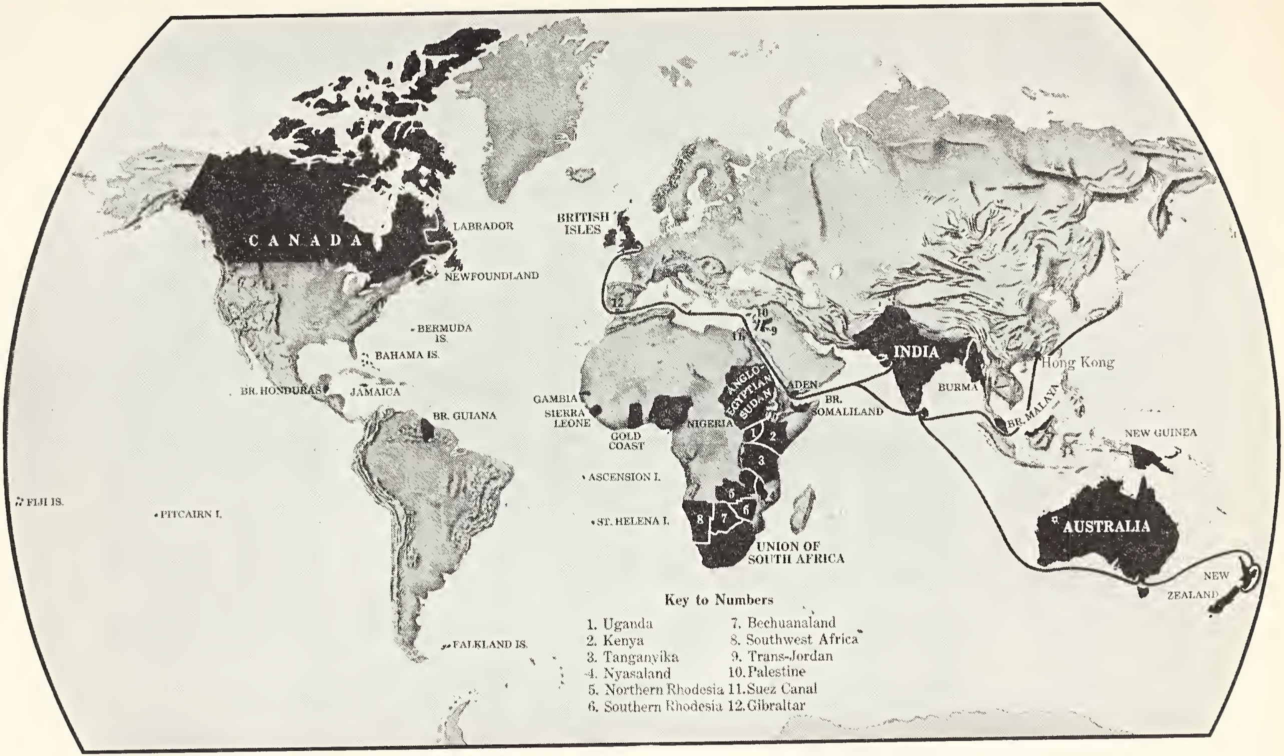
Today New Zealand is a farming country, very much like the agricultural England of long ago. Most of the people still depend for their living on two animals — the sheep and the cow. They sell the wool and meat of the sheep and the meat and dairy products of the cow. And these New Zealand farmers have built up a great business! They are the ones who furnish two thirds of Great Britain's imports of cheese, one third of her imports of butter, and one half of her imports of mutton and lamb. Forty per cent of New Zealand's main products are sold in London, 13,000 miles away!

New Zealand, like the Union of South Africa, is one of the self-governing dominions of the British Empire. Although it is practically an independent country, it is still loyal to the king of England. A British governor general resides there, and at all public occasions the people rise and sing two lines of "God Save the King."

Today over 90 per cent of New Zealand's people are of British ancestry. They are proud of being British — "more British than the British," as the saying goes.

5. *Australia: Also British*

In the last 150 years the conquering and settling British have made Australia into another self-governing dominion of the British Empire. Australia is an enormous territory of nearly 3,000,000 square miles, 60 times as large as England itself. In this continent live 6,600,000 people of British descent.



Map 24. The British Empire includes lands in every continent of the earth

The story of Australia is somewhat like that of New Zealand. A century and a half ago there were no Europeans at all in Australia. The land was inhabited by about 300,000 of the earth's most primitive food-hunters. Then, for a few years, — from 1788 to 1809, — Australia was used as a colony to which to send England's criminals. During these years only a few adventurous British emigrants attempted to settle there and to till the dry soil. But as soon as they realized that the land would make good grazing grounds for sheep they persuaded the British government to give them larger and larger grants of land. On these they began to raise sheep. Faster and faster, after 1810, grew Australia's wool industry. Bigger and bigger grew the flocks of sheep. By 1850 the total number of sheep passed the 17,000,000 mark!

Then, from 1851 to 1861, Australia had her gold rush. Immediately after Edmund Hargraves discovered gold in New South Wales in 1851, tens of thousands of miners from all over the world left their homes and rushed to Australia. How the population mounted then! In 1851 Australia had only 437,000 people on a continent as large as the United States; ten years later she had 1,200,000! The mining of gold spurred on the development of every side of life in the new colonies: the building of industries, railways, and telegraphs, and, what was very important, trade with England and other distant countries in the North Temperate Zone.

After the "get rich quick" gold rush ended, the people settled down to try to get a living from the land. Only on the southern, eastern, and western borderlands of the great continent could they do it; more than half of Australia was too dry for farming.

By 1935 a million acres of the coastal regions had been planted with fruit trees. This was made possible by a fine irrigation system. Better methods of cultivation enabled the

Australians to satisfy almost all their grain needs. But after 150 years Australia's chief products are still wool, dairy products, and meat. As in the case of New Zealand these are largely sold in British cities and transported in British ships.

And, like the New Zealanders, the Australians boast that they are "more British than the British."

Spanish and Portuguese Settlers Develop Twenty New Countries in the Americas

Almost 100 years before the British or the Dutch started permanent settlements in North America or in Africa, the Spanish and Portuguese were conquering the Incas of South America and the Aztecs and Mayas of North America. Tales of great riches drew bold Spanish and Portuguese fortune-hunters to these regions. Not for farming land and homesteads did they brave the Atlantic, but for gold and silver and precious stones to be stolen from the wealthy rulers of these advanced Amerindian peoples. For a century after Columbus's last trip to America these fortune-hunters conquered and killed and robbed, all the way from Mexico to Argentina. Millions and millions of dollars' worth of gold and silver were loaded onto Spanish galleons and returned to Spain, that is, whatever was not seized on the high seas by equally bold English sea pirates.

By 1700, however, most of Spain's navy and a large part of her merchant marine had been destroyed. Her "conquering" in the Americas was over. In each of the principal regions of Latin America — as the region from the Rio Grande to Tierra del Fuego was called — Spanish people (Portuguese in Brazil, of course) settled down and developed great farms called haciendas. On these estates, many thousands of acres in size, the Spanish gentlemen lived a leisurely life. They made the Indians and the imported Negro slaves do the work.

Another century passed while these regions slowly changed. The population increased as more and more emigrants came from Spain and Portugal. It is believed that by 1790 there were from 20,000,000 to 25,000,000 people in Latin America; of these from 3,000,000 to 4,000,000 were Europeans. Some of the newcomers married Indians or Negroes. Some — the better educated and wealthier ones — kept to themselves. Thus children were born and grew up: some "pure" Spanish or Portuguese, some Indian or Negro, some mixtures of several races.

These great manorlike estates slowly increased in wealth and size and remained part of Spain's and Portugal's "empires" until the years after 1810. Then came a wave of revolutions that overthrew the Spanish king in Europe and spread over all the American colonies. That story we shall read more fully in later years. Here we need merely remember that out of the next century of revolutionary changes, there developed 20 Latin-American republics. Their present names and populations can be seen from the following table.

TWENTY NEW COUNTRIES OF LATIN AMERICA

North America	Population	South America	Population
Costa Rica	578,000	Argentina	12,402,000
Cuba	4,008,000	Bolivia	3,171,000
Dominican Republic	1,200,000	Brazil	47,795,000
Guatemala	2,246,000	Chile	4,508,000
Haiti	2,550,000	Colombia	8,665,000
Honduras	963,000	Ecuador	2,702,000
Mexico	16,553,000	Paraguay	927,000
Nicaragua	750,000	Peru	6,500,000
Panama	467,000	Uruguay	2,040,000
El Salvador	1,575,000	Venezuela	3,414,000

Grand total in 20 Latin-American countries, 123,014,000

The Dutch in the East Indies

On the map following page 19 find the islands in the Pacific Ocean that are included in the Dutch Empire called Netherland India. Note how they stretch along the equator (from 6° north latitude to 10° south latitude) between the Asiatic mainland, the Philippines, and Australia. The names of these islands with their areas and populations are given below.

THE DUTCH EMPIRE IN THE EAST INDIES

	Area (square miles)	Population
Java and Madura	51,032	41,718,000
Sumatra	164,147	7,678,000
Borneo	239,286	2,439,000
Celebes	48,060	4,225,000
Remainder of archipelago	264,905	4,352,000
	767,430	60,412,000

Now find Holland, on the western coast of Europe. Little Holland, with an area of 13,203 square miles and a population of 8,475,000, rules this large tropical empire in the Pacific Ocean. It rules it and makes money out of it; but few Dutch people have gone there to live. Even today there are only about 250,000 European people in the islands.

For 400 years — since the 1500's, when half the European ships on the oceans flew the Dutch flag — the Dutch Empire has been in the making. Through the 1600's the rich and famous Dutch East India Company built up a great trade with India, Ceylon, and the islands to the eastward. Although since then the Dutch have lost most of the India and Ceylon trade, they have kept that of the other islands.

Remember, then, that while millions of British and Spanish settlers were forming new countries in the Americas and other continents, the Dutch business men were building up a rich empire of trade in the Pacific tropics.

Meanwhile the Russians Built a Vast Land Empire across Asia

Geography Again

The four peoples — the British, the Spanish, the Portuguese, and the Dutch — who settled the Americas, southern Africa, Australia, and New Zealand and other islands in the Pacific — all lived on the very *western* edge of Europe. Perhaps their location made sure that they would do that. "Geography again?" you ask. Yes, geography again helped to decide where man settled and made his home.

The geography of the very *eastern* edge of Europe was important too. While the western Europeans were crossing the seas "to find the better land over yonder," Russian home-seekers were moving eastward across Asia for exactly the same reason. The story is a long and exciting one. It lasted many hundreds of years. We can do no more than outline it here, but later we shall read the full story in *Changing Countries and Changing Peoples.*

For the beginnings of the story we go back to the 800's, when the ancestors of the present Russians lived as farmers in the valley of the Dnieper River in eastern Europe. To the east of them were the dreaded tribes of Mongols and Tatars; on the west were the "German" tribes; on the north were the Vikings.

From time to time peasant families, or even whole villages, would pack their goods on boats and float down one of the rivers. When they reached "better land," they would unpack and settle down to build houses and farms. As these people increased in numbers and moved about more, they settled larger and larger areas. Finally they had spread out over much of the plain we now call European Russia.

But about 1200 the fierce Mongols, after conquering China, India, and Persia, began to invade the villages and towns of the Russians. To get away from them, many Russian families moved from their home districts to a place called Moscow. For 100 years they lived in this region, becoming stronger and stronger in warfare. The time finally came when they defeated the Tatars and drove them back to Asia.

After that the princes of Moscow brought more and more regions under their government. In the late 1400's one of them made himself the "Czar" (emperor) of all Russia. Soldiers were sent farther and farther from Moscow to conquer new peoples. By 1700 the empire included practically all the peoples of eastern Europe.

Then started empire-building on a huge scale. The Russians had long been prevented from building up a rich trade with distant parts of the earth because their lands were inland, shut away from the seas. So, after 1700, the Czars did their best to conquer the peoples to the north of the Baltic and those to the south around the Mediterranean. Time after time their armies advanced both north and south. Finally, by 1721, Czar Peter the Great succeeded in getting a strip of land along the Baltic Sea. Later, Russian armies took Finland. Ocean ports at last, but cold ones, frozen during the winter. They still needed "warm water" ports, those open the year round.

The men of Moscow moved southward toward the Black Sea. Slowly, year by year, they took more and more land. By 1784 the Sea of Azov and the lands round about were included in the Russian Empire. Bordering on the Black Sea was the fertile region called the Ukraine. This the Russians conquered in 1793. By 1795 they had added a great eastern portion of Poland.

Meanwhile a great migration of peasants eastward had been getting under way. As early as the 1500's settlers had moved down to the Caspian Sea, at the mouth of the Volga River. Gradually they settled on the lands between the Caspian and Black seas. Slowly, adventurous ones among them went eastward into Turkestan. About 150 years passed. By 1881 all Turkestan had been made a part of the Russian Empire.

Meanwhile other pioneering families had begun to go eastward across the Ural Mountains into the great forests of Siberia. As early as 1581 one group met the Tatars, defeated them, and captured their main town, Sibir. After that more and more families packed up and moved eastward from European Russia. Onward, onward the settlers moved, year after year, each group pressing farther east across Siberia. Two hundred years passed in this way, with the Russians steadily advancing eastward across Asia. Finally by 1800 there were Russian settlements from Europe all the way across Siberia to Vladivostok, on the Sea of Japan. In the end the Russian Empire was 6000 miles long, stretching from Poland on the west to the Sea of Japan on the east (map 25).

Does this eastward movement of the Russians in Asia remind you of the westward movement of the Americans? of the northward movement of the Dutch in Africa? Each of these was taking place during the past 300 years.

Do you wonder that we call all these movements together the "greatest migration in human history"?

Summing Up the Conquest of the Continents

1. *A World-wide Conquest and Settlement*

Now let us come back to map 25, for it sums up the story we have outlined. Note how the lines of settlement of the new countries branch out from five countries of Europe to every continent and all the principal islands of the earth. Every large habitable region on the earth was settled. The Great Migration was indeed world-wide.

2. *All the Oceans Were Crossed*

Since the migration was world-wide, the Europeans had to sail the "seven seas" to find lands where they could build new homes. What courage that required! Try to imagine how you would feel if you were on the ocean, 1000 miles from any land, perhaps for weeks at a time in a little boat no larger than the *Mayflower*. What does that teach you about the kind of people who went out from Europe to build homes in a new world?

Were they weaklings, avoiding danger?

Were they timid stay-at-homes who humbly obeyed their rulers?

Were they people who "played safe," unwilling to take risks?

Were they lazy, "shiftless" people, disliking hard work?

What do you think?

3. *Migrations Have Lasted Four Centuries*

Not only is this movement of human beings round the world the greatest in all history. It has lasted the longest. Already it is 400 years long, and it is not over yet! Notice carefully when the Great Migration started.

1. It began in the early 1500's with the first little Spanish colonies in Mexico, Peru, and other lands of Central and South America. Before that time there was not a single important settlement of European people outside of Europe. There were no permanent colonies of British, Dutch, or French in the 1500's. Most of the Europeans who had gone out to the other

continents were daring explorers. They claimed the various lands for their kings, but they had no idea of living in them themselves. After each trip they returned to their European homes.

2. By the early 1600's — 100 years later — very small settlements of western Europeans had been made on the coasts of North and South America and at the southern tip of Africa. How many European people altogether had gone out by that time? Millions? Far from it! Not even one million! Probably there were not 100,000 people in colonial settlements, including the British colonies in North America, the Spanish and Portuguese colonies in South and Central America, and the Dutch colonies in South Africa.

3. By 1750 — some 200 years later — these had become large settlements. Great Britain alone had thirteen colonies in North America with 1,250,000 people living in them. In Canada there were some 80,000 French settlers. France also had tiny settlements along the northern coast of South America and on a few scattered islands, such as Madagascar, off the African coast. There were hundreds of thousands of Spaniards scattered in colonies from Mexico almost to the southern tip of South America. The Dutch colonies in southern Africa had grown slowly.

4. Then, in the 1700's and 1800's, these European colonies grew with enormous speed. By 1840 there were 25 new independent countries. Every continent had them — North America, South America, Africa, Australia, and other parts of the Pacific. Tens of millions of white people were living in them.

5. In the middle 1800's and later the number of emigrants increased rapidly. Between 1820 and 1920 as many as thirty-three million entered the United States alone! More millions went to South America, to Africa, and to Australia.

4. *Twenty-five "New" Countries*

Today, 400 years after the first Spanish colonies, these settlements have become 25 countries. Because they are much younger than China, Japan, India, or the European and Mediterranean countries, we call them the *New Countries.* Most of them are, in fact, less than 150 years old.

Twenty-two of them are in North and South America. Two, the United States and Canada, are chiefly British in ancestry. Nineteen are Spanish. One, Brazil, is Portuguese.

One, the Union of South Africa, is in Africa. Three fifths of the European people there are Dutch ; two fifths are British.

Two, Australia and New Zealand, in the south Pacific, are settled altogether by the British.

This, then, is a brief introduction to the conquest and settlement of the earth carried on by the Europeans largely after 1600 A.D.

WHY DID THE EUROPEANS EMIGRATE?

Perhaps you are thinking : "Human beings seem to be the 'movingest' animals ! They're always migrating — moving from place to place !"

That is true. That is what migration means — people moving out of one region to settle in another. In every race, in every large group, there are always some who are not content to "stay put." For one reason or another they stay a while and then move on. A few go because they are just restless and want a change of scene, a change of people, a different life. They are the adventurers, the travelers, the explorers, the wanderers.

Others move to a new land because they are "independent-minded." They may not agree with the government. It puts them in jail for their opinions or for their refusal to obey the laws. They want to be free, to help toward making the kind of government they really believe in. Others may migrate because they are not allowed to worship as they choose; the Church and the government may dictate their religion. So, being independent, having opinions and beliefs of their own and the courage to stand up for them, they decide to leave. Packing up their belongings, they go to the nearest port and sail across dangerous seas to stake out a new country in a different continent or island.

The Chief Reason: Desire for a Better Living

As we continue our studies we shall see that there are many reasons which make people leave their relatives and friends, break all the old ties, and emigrate to a distant land. But, of all the reasons, one reason has played a bigger part than any other in the Great Migration since 1600.

This reason is the desire for a better living. The more restless, independent, and ambitious farmers are lured away by reports of "better land over yonder." Rumors of the settlement of a new country always open up pictures in the minds of traders of the chance of being the first to build up a new and growing business. So they hurry to the new region to be "in on the ground floor." Those who like to speculate or gamble with land think: "If I stake out that land and more people come there to live, it will increase in value, and I'll get rich"; or, "A railroad will be built there, and my land will be very valuable"; or, "A city may grow up there, and my few acres will be worth millions!"

Reports of discoveries of gold and silver in America, in Africa, in New Zealand, and in Australia drew tens of thousands of adventurous people. Men and women from all over the world threw up their jobs, sold their homes, and braved the dangers of angry seas and forest wilderness to "strike it rich" in the new land. "A chance to make a fortune!" they thought.

After 1850, business men who dealt in lumber or coal, iron or copper, searched the new continents for natural resources.

A book could be filled with stories of the reasons why millions of Europeans packed up and crossed the oceans and continents to build up new homes in distant lands. Although we shall study them more carefully in later volumes of this series, let us see just a bit more of the story of the Great Migration before we leave it.

After the New Countries Were Founded Other Europeans Helped To Settle Them

To call the British, the Spanish, the Portuguese, the Dutch, and the Russians the founders of the new countries does not mean that the people of the other 24 European countries did not help to develop them. They did indeed. Consider the building of America as an example. After the British had settled the thirteen American colonies, millions of other people went there to live. In the early 1800's and in later years, hundreds of ships brought Irish people to our ports. From 1690 to now (but especially in the 1840's and 1850's) great streams of German emigrants have come to the United States. In the 1870's and 1880's hundreds of thousands of Norwegians, Danes, and Swedes came from Scandinavia to help to build the new America. Finally, just at the end of the nineteenth century no less than 1,849,000 Slavs, 2,061,000 Italians, and 1,000,000 Jews came and settled in our northeastern cities. Altogether, more than 40 countries have sent emigrants to the United States since its founding in the 1600's. That story we shall study carefully in *Our Country and Our People.*

The story of the settlement of America is much like that of each of the other new countries. Italians and Portuguese, Belgians and Czechs, Rumanians and Finns, and a score of other European nationalities have gone out round the world to help in building up the new countries. If there were space here, we would tell how the French have taken huge colonies in Africa, in Madagascar, in Indo-China; how today they control ancient Syria in the Fertile Crescent as well as the nature peoples of scattered islands round the world. That, however, is a long, long story, and we shall study it more fully in *Changing Countries and Changing Peoples.*

MEANWHILE THE STAY-AT-HOMES BUILT UP THE OLD COUNTRIES

This, then, is the achievement of the more daring pioneers who left the older European countries and settled 25 new countries in other continents.

While this was going on, what was happening at home in Europe? No doubt you can answer that question yourself. The people who stayed at home — in England, in France, in the other European countries — year after year went on their way doing their work, marrying and having children, and making homes.

For, after all, most people are satisfied to stay at home; to live year after year, even generation after generation, in one place and in about the same way. For example, there are millions of Chinese families who have lived on the same little farms for hundreds, even thousands, of years. Even in the younger European countries, such as France, we know of families that have tilled the same fields for over 1000 years. Fathers die and sons carry on the work until they die also, and then their sons carry on.

So the stay-at-homes in Europe tended their farms and shops and homes during the centuries that their pioneering neighbors were struggling to make new countries. And so Europe went on.

The growing of crops changed.

Transportation changed.

Communication changed.

Banking and business changed.

Architecture and homes changed.

Education changed.

Dress changed.

Recreation changed.

Changes came in all the ways of living. A whole new civilization developed. Industrial countries took the place of agricultural ones.

But — we must caution you again — *there were only a few industrial countries for a long, long time.* Ways of living in the older agricultural countries continued to change as they had before, but very, very slowly.

First, as you know, little England, a farming and trading island, became in less than 200 years a powerful manufacturing Great Britain. France changed too and took up manufacturing. So did Germany still later, and Belgium. In certain regions Holland and Italy followed their example. Very much later Japan, in the Far East, India, and even the east-coast cities of China took up the new engine-machine way of doing things.

Meanwhile the industrial idea was carried overseas to the new countries. As you know, the United States became a world leader in machine-manufacturing half a century ago. Canada took up the idea, as did also the Union of South Africa. Australia and New Zealand followed suit. Even in Central Africa and up and down the coast of South America machines and engines came into use. Finally, within the past twenty

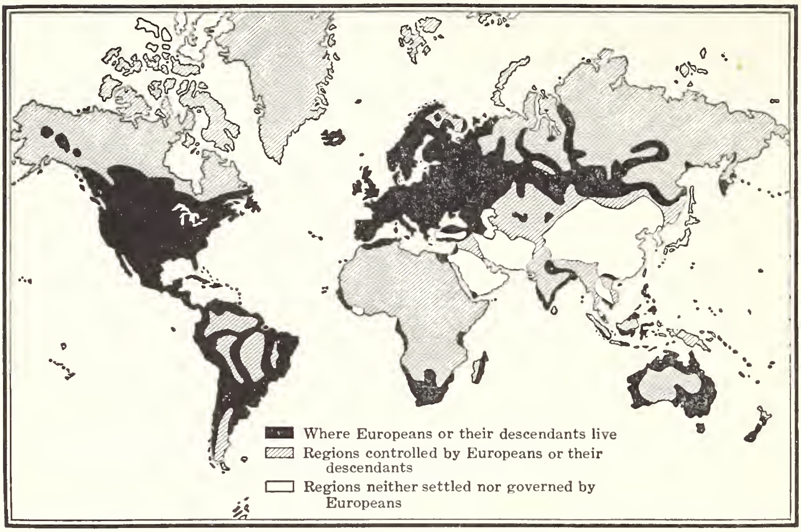

■ Where Europeans or their descendants live
▨ Regions controlled by Europeans or their descendants
☐ Regions neither settled nor governed by Europeans

FIG. 145. With the help of the key in the lower part of the map you can see the parts of the earth which Europeans or their descendants inhabit today and many other regions of the earth which they control. Look also at map 25

years, ancient Russia began to dig mines, to build factories, power stations, and railroads, and to establish telephone and telegraph and airway systems.

Is the World Being "Europeanized"?

Thus we see that the civilization Europe built up — at first so slowly, and then with lightning speed — has begun to spread round the world.

It is frequently said, therefore, that in taking the untouched continents and islands after 1500 the Europeans introduced into each their own new kind of civilization. Putting it differently, they "Europeanized" the earth. How true is that?

We are near the end of this book, and cannot give enough facts to answer that question completely. In the next two volumes of Man and His Changing Society[1] we shall do that very thing. In the concluding chapters of this book we can do little more than hint at the answer to the question.

One convenient way of doing it is to compare pictures of ways of living in countries in distant continents. If photographs could have been taken in China, Australia, South America, and Central Asia, and in our own country 200 years ago, each would have pictured a life very, very different from each of the others. Houses, clothing, customs, ways of working, means of transportation and communication, marketing, — everything would have been different.

What about today? In magazines and newspapers find pictures which were taken recently in industrial cities and towns on each of the separate continents.

What do you think? Are ways of living that Europe built up being used in other lands? Is the world being Europeanized?

DIFFERENCES BETWEEN THE NEW, INDUSTRIAL CIVILIZATIONS AND THE OLDER, AGRICULTURAL ONES

Let us sum up the results of our study. Just how is the new civilization of Europe unlike the old civilizations of the river valleys? Consider several definite examples.

1. Man's Power Aids

1. *In Earlier Civilizations*

The muscles that lay hidden under the weather-beaten skin of peasants; the muscles in the straining necks and legs of patient animals, — these were man's power aids in earlier civilizations. They did the work needed to provide food for millions of people the world over. A Chinese peasant sweating under a hot sun lifted each little rice plant from a clump and placed it in muddy water. Again and again he stooped over, working in the water all day. How small a quantity of rice he got for all his back-breaking work!

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[1] *Our Country and Our People* and *Changing Countries and Changing Peoples.*

2. *In the New Industrial Civilization*

Mechanical power! By means of powerful engines one man riding behind a gasoline engine can plant, cultivate, and harvest the food for many people.

Mechanical power! One man guides the course of a great steamer which is carrying tons of food to people in faraway lands. Another man controls a train which is carrying 200 or more human beings from one town or city to another. A third man turns a single switch, and 100 or more cities are furnished with electricity.

2. Tools versus Machines in Doing Man's Work

1. *In Earlier Civilizations*

A peasant's hoe hacked away at the baked earth so that his bean plants would not dry up. A woman washed the dirty, oily wool from the sheep and hung it up to dry. She combed and carded it and pulled it out into yarn. Finally she wove it into cloth on a simple loom. Later she sewed it by hand into a garment for her husband.

The very simplest tools were used for all the kinds of work. It was only if everybody worked hard that enough food and clothing could be produced to keep people from starvation or from freezing to death or from dying during the frequent dry seasons.

2. *In the New Industrial Civilization*

The power-driven machine moving through a field cuts a wide path through a field of grain. It gathers the plants into bundles, ties them, and drops the bundles in great piles. A snorting threshing machine takes in the neat bundles. It dumps the grain kernels into a bag and blows the stems and hulls aside. Machines do much of man's farming for him.

Machines make men's clothes. They clean and dry the wool. They card and spin and weave; they make cloth. They dye and cut cloth and sew it into garments.

3. Transportation and Communication

1. *In Earlier Civilizations*

In earlier times people did little moving from one place to another, more distant place. The Chinese transported things in rowboats or sailboats. The peasant rice-farmers carried their produce on their backs or slung on poles between two men. Oxen pulled loads over hills and valleys, jolting steadily along till something on the cart broke or a wheel got stuck in the mud.

Communication was no faster than a man could travel on foot or be carried by a horse or other animal.

2. *In the New Industrial Civilization*

Count up the many kinds of transportation in the industrial countries today. There are trains, automobiles, ocean liners, airplanes, motorcycles, streetcars and busses, elevators, interurban cars, elevated electric lines, and subways.

Count up the kinds of communication. Messages are sent by fast train, by airplane, by telegraph, by telephone, by radio.

4. Home Crafts versus Large-Scale Factory Production

1. *In Earlier Civilizations*

Few goods were made outside the home. A family produced its own cloth and its own tools. The man of the family cobbled the shoes and built the house. The woman dried the vegetables and fruits and stored the food and prepared it. Each household was in itself a little manufacturing center, a storage warehouse, and a market. How few things were made! How proud the craftsman was of each thing that he finished!

In the shops where craftsmen made shoes, plows, harnesses, horseshoes, or swords, they and their helpers worked together much as father and son or as farmer and "hired man."

2. *In the New Industrial Civilization*

Many things are made by machines in factories, and in large quantities. Factories are expensive to build and to equip. To buy great quantities of raw materials from distant lands requires large sums of money. Companies are formed to provide the money.

To do the work in factories, the many people working together must be well organized. There are many special departments and many different kinds of workers within each department.

5. Trade: Local or World-Wide?

1. *In Earlier Civilizations*

In earlier civilizations one family or village was quite independent of its neighbors because it provided almost all the things needed. We say that trade was local. People traded with outsiders only to get things which were rare or unusual. And exchange of goods was by barter instead of by money.

2. *In the New Industrial Civilization*

In new industrial countries the farmer buys factory-made clothes; the mine-worker buys his food. In order to supply everybody with things made in different places, a great deal of trade is necessary. Wholesalers, retailers, salesmen, bankers, advertisers, — all are busily at work trying to keep trade going. Salesmen travel between countries, cities, towns, and villages, selling goods.

If this trade should stop, disaster would follow. Big factories would stop running and millions of people would be out of work. It would be impossible for anyone but the farmers to live, and even they would soon be reduced to primitive hand-farming.

Trade! Trade! Trade! The whole industrial world depends on constant buying and selling.

6. Necessities and Luxuries

1. *In Earlier Civilizations*

Peasant families in earlier civilizations had such necessities as these: a house, a cow, some chickens, and some simple garments good for wear year in and year out. Part of the house was a stable where animals were kept. The furniture was simple and homemade. A fireplace furnished the heat in the coldest weather. Perhaps there was a wooden floor, and perhaps there was only the ground. There were few kinds of food, and these were very simple.

2. *In the New Industrial Civilization*

People have many wants, and these constantly increase in number. Who would have wanted an automobile 60 years ago? Yet today automobiles are regarded as necessities by both farm and city families. Who knows but what airplanes may be regarded as necessities tomorrow!

Eyeglasses; fillings in teeth, — these are necessities today. Yet imagine an ancient river-valley farmer thinking about getting a molar filled! Sanitary bathrooms are a necessity in the cities of today; they are taken for granted; yet in earlier civilizations there were none. Some kind of house-lighting is a necessity, and kerosene lamps are really very old-fashioned. It would be a hardship today to go without books, baths, handkerchiefs, sugar, or letters from home.

In industrial countries people are forever needing more and more things.

SUMMING UP WHAT WE HAVE LEARNED ABOUT WAYS OF LIVING IN DIFFERENT CIVILIZATIONS TODAY

1. The New Industrial Civilization

At the one extreme is the very highly industrialized country. Great Britain is a good example. Four out of five of her people live in cities or towns. They work in factories and stores. They operate trains and other kinds of transportation. They dig in coal and iron mines. They sell goods all over the world. They study science and use scientific knowledge in every part of life. Most important of all, Great Britain — and every other industrial country as well — is very dependent on other lands for food, for raw materials, and for trade.

2. The Agricultural Civilization

At the other extreme is the agricultural-handicraft civilization. In China, for example, practically all the people live in villages and are engaged in farming or handicrafts. Few people work in factories. There are few trains or paved cities, few automobiles, telegraphs, or telephones. The Chinese are almost self-sufficient. Their lives depend very little on other peoples. And so it is with other agricultural countries.

Between these two extremes are many countries which are partly industrialized and partly agricultural-handicraft. France, for example, uses machines on its larger farms and in its many factories, but much of the work, both on farm and in shop, is done with hand tools.

Books You Would Like To Read

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Barnard, E. F., and Tall, L. L. How the Old World Found the New. Ginn and Company, Boston.

Franck, H. A. Mexico and Central America. F. A. Owen Publishing Company, Dansville, New York.

Gordy, W. F. American Beginnings in Europe. Charles Scribner's Sons, New York.

Hartman, Gertrude. The United States and How They Came To Be. The Macmillan Company, New York.

Horsley, R. E. New Zealand. Thomas Nelson & Sons, New York.

Lang, W. H. Australia. Thomas Nelson & Sons, New York.

Marshall, H. E. Canada's Story. Thomas Nelson & Sons, New York.

Marshall, H. E. Our Empire Story. Frederick A. Stokes Company, New York.

Prescott, William H. The Conquest of Mexico. Junior Literary Guild, New York.

Shaw, E. R. Discoverers and Explorers. American Book Co., New York.

Willson, Beckles. The Romance of Canada. Thomas Nelson & Sons, New York.

PART VI

The Gains of Civilization

OUR story of civilizations has certainly proved one important fact: that ways of living today are very different from those of early times. Of that we can be sure. But still there is a big question left in our minds: Are these new ways of living *better* than those that have preceded them? Ah! that is another matter! Different they are, indeed; but are they *better*?

THE GREATEST GAIN OF ALL: BETTER WAYS OF THINKING

Of one enormous gain there can be no doubt. In all these books of Man and His Changing Society we have shown that as the years and centuries have passed, man has learned to think more and more clearly.

We say that New Stone Age man thought better than Old Stone man and others who lived before his time. He showed this by inventing better tools and weapons, better houses and clothing, and better foods.

There is no doubt that the great river-valley peoples thought more clearly than the New Stone Age peoples. We know from their inventions that they had more to eat and a more varied diet. They had finer houses and clothing. Their means of transportation and communication were better.

Then came the Greeks and other Indo-Europeans who settled Europe. They learned to think still more clearly. And how they used their imaginations! They studied the world around them. They questioned the "why" of everything. They began to wonder how the world came to be as it is, what is true and what is false, what is just and what is unjust, what is right and what is wrong, how people should be governed, and the like. "Let us think . . . think . . . think!" they cried. "Let us think things out for ourselves!" These people, we say, were the first real scientists.

Nearly 2000 years passed while the many tribes were making the new countries of Europe. And during this time invention kept on. New tools. New weapons. New implements. New machines. New ways of working. New houses. New clothing. New recreations.

And still time went on. Century after century more and more inventions were made, until we reach our own day.

And now as we look at our ways of living today, can we say that they are better than all others? What do we mean by "better"? When is one civilization better than another? Is it when the people live longer? when they have a better diet? when they have less illness or fatigue or pain? when they work shorter hours and thus have more leisure time? Are these all signs of a *better* civilization?

CHAPTER XXVII

From Magic to Science: Better Thinking throughout the Ages

How Superstitious Are You?

Do YOU believe as these boys and girls do?

1. Two boys are walking by a big "movie" house. Someone is standing on a tall ladder, putting up the sign for the next movie. The ladder reaches partly across the sidewalk. As one of the boys starts to walk under it the other pushes him to one side, exclaiming: "Don't walk under that ladder! You'll have bad luck!"

2. "I know I can't win today," says Mary as she enters the auditorium, where the oratorical contest is to be held. "A black cat ran right in front of me on my way to school!"

3. At Florence's birthday party one girl says: "I shouldn't sit down with you. There are twelve at the table now. I'll make the thirteenth! That'll be unlucky!"

4. Mary Peirce makes a suggestion at the meeting of the Social Studies Club: "Mr. Chairman, I move that we postpone the date of starting our camp this year one day. Look at the calendar! We have chosen Friday the thirteenth!"

5. A boy asks another about the furry thing on the fender of his bicycle. "Why, it's a rabbit's foot. It means good luck. No accidents will I have!" is the answer.

These are five examples of superstitions; five examples of "magic." Do you believe in them? Many people do — even grownups. Here are some more examples:

Mr. Jackson tells his two friends, who are lighting up cigarettes: "No, thanks, I'll use my lighter. Bad luck to have 'three on one match.'"

Mrs. Taylor warns Mrs. Jenkins: "Don't sweep in front of your daughter. She won't get married!"

This is Mrs. Franklin's advice to a young mother: "Don't cut your baby's fingernails. She'll die within three months!"

Can you add some other common superstitions? Tonight when you go home ask your relatives and neighbors to tell you some more. Tomorrow in class make a list of all those you have gathered. You'll be surprised to find out the number of grown-up people who are really very superstitious. Yes, even today, in our modern America and among grown-up people. Of course there are not so many superstitions among well-educated people as there are among people who have not been educated, but still there are some.

Among the "mountain whites" in a certain region of our country there is the superstition that "stepping on a spider brings rain." Probably not one high-school graduate in a hundred would believe such a thing. Why not? Because they have studied the causes of rainfall. They know, and you know, that certain geographic conditions bring rain to a region of the earth: (1) the direction of the winds; (2) the lay of the land; (3) the season of the year; (4) the nearness of oceans, seas, and great lakes; and so on. There probably is not a boy or a girl in your class who really believes that stepping on a spider brings rain.

Nature People Are Very Superstitious

Careful studies show that nature peoples believe in many, many superstitions. These beliefs are passed down from generation to generation. Children are taught, from an early age on, to believe in them.

Let us take some of their superstitions about the weather.

1. When the Toraja tribe of the Celebes islands needs rain for their rice plants, the people string up water snails and tie them to trees. They tell the snails that they must hang there until rain falls. So the snails plead with the gods, and the gods, in pity, send rain!

2. To bring rain, the natives of Saiko in Assam, India, attach the head of an eel to a pole which a man points toward the sky. Water is poured over the pole, the eel, and the man. The spirit of the thirsty eel brings the rain.

3. In April, just before planting time, the Araons of India believe that they can bring rain in this way. First, the women go to the village spring to bathe. Then they fill pitchers with water to pour on a certain sacred tree. As the water drips down they sing: "May rain fall on earth like this!" Then the wife of the village priest makes certain marks on the tree, and the women all leave. Later the priest kills a red cock at that spot. The Araons believe that rain will come within two days.

Hundreds of examples like these can be given from the beliefs of tribes in Africa, in the Americas, in Asia, and on the islands of the seven seas. Magic to make the rain come! Magic to make the sun shine! Magic to make the winds blow! These nature peoples actually believe that they can control the weather.

Many of them also believe that magic can heal body wounds caused in accidents. When a man belonging to the Karogo tribes of Nigeria, in Africa, is cut by a spear or sword, the wound on his body is not treated. Instead the *weapon* is washed in certain ways! Hundreds of examples can be given of such practices among ignorant tribes.

But we need not go to nature peoples to find superstitious beliefs in the field of medicine. They are found among the uneducated people of modern nations. About 60 years ago a student collected many stories of the way people in villages of England treated injuries to the body.

For example, in one village he found that when a reaper was cut by his sickle it was not uncommon to clean and polish the sickle!

If a boy hurt his hand with a rusty nail, the nail was immediately taken to a blacksmith, who removed the rust. Every day for a certain length of time the nail was carefully rubbed before sunrise and after sunset. That was the way to heal the injured hand.

In another place a young man's pony stepped on a nail and became lame. The lad took the poor creature to the village blacksmith, who immediately asked for the nail. When he learned that it had been left in the road, he shook his head and said: "Ah, sir, if you had picked it up and wiped it, and kept it warm and dry in your pocket, there'd have been a better chance for your pony, poor thing!"

Another case is that of a man who had fallen down upon a swordstick and hurt his back. This kept him in bed for several days. During the whole of this time the swordstick was hung at the head of his bed. At certain times each night and day it was polished by a lady's hand. And how clean it was kept! A single spot of rust would have caused the death of the wounded man.

The magic of footprints among certain peoples is even more interesting.

If a man in San Cristoval, one of the Solomon Islands, wishes to kill an enemy, he will sometimes smear his own feet with lime and then walk step by step in the tracks of his foe. This, he believes, causes the man's death. Or he scrapes the bone of a dead man and sprinkles the powder on the tracks of his enemy, at the same time driving the bone into the footprints. With that the hated one is supposed to die!

Sometimes when a man finds the footprints of his enemy, he takes them home with him. This is supposed to cause his enemy's feet and legs to break out into sores. If a man suspects another of having done this to him, he gets a friend or a relative to call on the suspected one and persuade him to throw away the earth from the footprints. If the sores on the man's legs and feet do not heal right away, there is a war on the "magician."

In British New Guinea a Kiwai Papuan shoots arrows into his enemy's footprints when he thinks it is hopeless to pursue him because he has got too good a start.

To do harm to an enemy or to an enemy's horse or ox, a Palaung of Burma takes earth from the man's footprints or from the tracks of the animal. Whether the earth on them is broken or in one mass, it is wrapped in large leaves and roasted over a slow fire.

Until Very Recent Times Most People Gave Superstitious Explanations of Happenings

Perhaps you are saying, "Such things could happen only among ignorant savages!" Yet in parts of modern Europe and America, even today, almost always in places where the people are not well educated, a few can still be found who believe similar things.

One might even say that the history of changing civilization is in part the history of slowly disappearing superstitions. One by one these beliefs have disappeared. And this has happened as men began to think better and better; as men came to know more and more about science; as they gained more exact knowledge.

The history of better thinking will engage much of your study during the coming years, probably even for the rest of your lives. And it might well be said that nothing in your education will be more important than that.

At this time we can take but a single example of the important history of better thinking. This is the story of man's fight for a better life through the improvement of his health.

AN EXAMPLE OF HOW SCIENCE HAS HELPED MANKIND

Man's Fight for Better Health

Throughout history human beings have asked two important questions: (1) "What makes a person sick?" and (2) "How can he be made well?"

A strong man's face becomes red; his body aches and perspires; he breathes heavily; he becomes weak; he cannot stand; finally he goes to bed. Why is he sick, and how can he get well?

Someone gets a chill, which shakes him from head to foot; his body breaks out with great sores; his skin turns black. He is sick. What can be done for him?

Savage nature people asked these questions. The first "civilized" people asked them. The Greeks and Romans, the later Europeans, — all asked them.

And each people tried to find the best answers.

The Charm, or Amulet: Savage Nature Man's Defense against Danger

Do you believe that hanging "charms" around one's neck (such as a string of beads or carved bones, stones, pieces of metal, wood, or leather, or tufts of hair) will keep one safe from disease? Do you believe that such charms, or amulets, will protect one against poisonous snakes or wild animals or a dangerous enemy? Many, many human beings have believed in these things in the past; indeed, there are some who believe in them today.

Do you believe that drinking a medicine brewed from such things as the gall of a crocodile, the whiskers of a leopard, or the brains of certain birds will bring you the friendship of certain people or kill your enemies? Some people believed in that. It was their answer to the second question, How can we protect ourselves against dangers, disease, and the like?

Nature peoples were sure that "evil spirits" were all around them — in the sick person, in the rustling leaves, in the thunder and lightning, in the roaring wind.

Our own European ancestors said such things as: "The devil has taken him!" Or, "A witch has done this thing!" The Egyptians, the Sumerians and Babylonians of Mesopotamia, had such ideas too. We know that, because the stories of their beliefs were written down in records which our scientists have found.

Thus we know that the first civilized peoples believed in magic also. Like the thousands of tribes of savages, they too had their medicine men. These were magicians who were supposed to be able to bring rain or sunshine, to make sick people well, to bring victory in battle.

Hippocrates, the "Father of Medicine": The First Step toward Science

There were a few thinkers among the Greeks who tried to give better answers to the questions, Why is he sick? What will make him well? Hippocrates, born in 460 B.C., was such a thinker, and he is sometimes called the first physician. He laughed at the evil-spirit-and-charm idea. He said the cause of sickness was that the body itself did not have the proper amounts of such things as blood, phlegm, black bile, and yellow bile. This condition had to be changed, he said, before the person could be well again.

It is true, of course, that Hippocrates' ideas were far from correct. Modern scientists of medicine have proved that. But it must be admitted that he was on the right track. He was at least *scientific* in saying that the causes of sickness are in the body itself. "Study the body!" he preached. "Do something about changing the body itself. It does no good to sing songs or beat drums or wear charms."

For 2000 years Hippocrates' ideas slowly took hold of the minds of European doctors. They too began to study the body. More and more of them treated the body wound — not the nail or the knife, the ax or the stick, that caused it. Even though they knew little about flesh and bones and blood, they tried to find the answer to the questions by treating the body. That in itself was a great gain.

But for 2000 years — from about 400 B.C. to the 1600's A.D. — physicians knew little more than did Hippocrates.

Now the 1600's, you remember, was the time of great interest in science. Science meant three things especially. First, it meant observing the world exactly. Second, it meant experimenting. Third, it meant thinking as clearly as possible about what happened during the experiment.

An Experiment

For example, one of the well-known superstitions of that time was: "Put a spider inside a circle made of powder from the horn of certain animals, and the spider will be unable to crawl out." People had believed that for no one knows how long.

One group of scientists — Robert Boyle, Isaac Newton, and others — said: "Let's see if it's true! Let's experiment!" So, in a secret meeting, they actually put a spider in a circle made of the powder. Of course the spider crawled out! Time and time again they repeated the experiment to make sure. Each time the spider crawled out!

Finally, when they were absolutely sure they were right, they said: "Just superstition! Our experiments prove it. We tried it many times, and it doesn't work."

Then Came the Invention of Instruments To See Better and To Measure Better

All through the 1400's and 1500's the thinkers among the Europeans were making new instruments. Some of these — the telescope, for example — helped men to see what they couldn't see with the naked eye. Some — the astrolabe and the sextant (to measure the position of stars in the heavens), the thermometer (to measure heat), the pendulum clock (to measure time), and others — helped in other ways. And with these new instruments the thinking men of Europe could measure more exactly, could observe more carefully.

Astronomy — the science of the stars — advanced when the telescope was invented. When the astrolabe and the sextant and other instruments were invented, men could measure and locate places on the earth better; thus the science of geography grew.

All Honor to the Microscope's Inventors!

Perhaps the instrument which did most to help man to improve his health was the microscope. And although the microscope users of the 1600's did not know it, they were starting something that was to lead men to discover the causes of terrible diseases and to begin a great war upon microbes. With the microscope men could see the tiny things in animal and human bodies that were causing all the trouble.

Robert Hooke and Anton van Leeuwenhoek made microscopes that would magnify things 100 times! They squinted at everything around them: the wool of sheep, the bark of trees, spots on the skin of human beings. They looked especially for the little things that could not be seen with the naked eye — the sting of a bee or the leg of a louse or the pores of the skin or the make-up of a hair. And they looked ever and ever so carefully! Still they were not satisfied. They made stronger and stronger microscopes.

What the Microscopes Did

Microbes! Tiny creatures, so small that not until they had been magnified many times could they be seen.

Leeuwenhoek saw them first in rain water which was supposed to be pure. Tiny little crawling things. "They swim! They crawl!" he shouted excitedly to his daughter. "These wretched beasties are *living* animals in pure water! I've seen something no human being has ever seen before! Beasties! And so many kinds! And so small! About 25,000 of them side by side would not fill an inch!"

People wouldn't believe him. One by one he made them peek through his best microscope. There they were! "There must be billions of these beasties in all human beings!" Leeuwenhoek told them. "See, I can take a speck of white off your teeth, and — there! millions of the beasties in one speck! And in meat too, every piece of meat! And —"

Well, to make Leeuwenhoek's story short, before he died in 1723, at the ripe old age of 91, he had opened a whole new world of observation and study to thinking men. He proved that microbes, as we call them today, are everywhere: in the air . . . on and in our bodies . . . in fact, on and in all living things — all animals and all plants.

Leeuwenhoek did not discover all about these microbes, however. He did not learn how they were born and grew or what they did to people's bodies. But in giving the world a fine microscope and in proving the existence of microbes to other people he certainly had done enough for one man to be remembered through the ages.

He had done much in starting thinking men on the road to discover the answers to the two important questions: What makes people sick? What will make them well again? And after him came many, many brave and brilliant discoverers and fighters of disease. There is no better way to learn about the gains of modern civilization than to study the tireless struggle of these wonderful "microbe-hunters," as Dr. Paul de Kruif has called them.[1] In this book we cannot even mention all the most important ones; we must be content to describe a few of the many searches and experiments.

Spallanzani: How Microbes Multiply

In the hundred years that passed after the death of Leeuwenhoek, only one great microbe-hunter need hold our attention. This was the Italian scientist Lazaro Spallanzani (1729–1799).

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[1] Formerly one of the "hunters" himself, Dr. de Kruif has spent fifteen years in the writing of this great story from the lives of the workers themselves. The better readers should read his *Microbe Hunters* and *Hunger Fighters*.

For one great discovery, especially, we remember him — the discovery that microbes, like all other living creatures, are born. "Leeuwenhoek's tiny 'beasties' are born from other tiny 'beasties,'" he said. Those who claimed that such microbes just formed "out of the air" were wrong. "Nonsense," Spallanzani insisted. "They're born! And they multiply by the billion and with great speed!" There was a terrific controversy over this problem, but by careful experiments Spallanzani proved that he was right.

Nearly 50 years more passed after Spallanzani died. Then came, perhaps, the greatest and most famous of all the microbe-hunters.

LOUIS PASTEUR: "IT IS MICROBES THAT CAUSE DISEASE!"

Here was a man to answer our first question, What makes people sick? Here was the one who proved that microbes cause the trouble. Louis Pasteur (1822–1895), a French country boy who became a chemist, discovered this answer. But he made his discovery only after years of experiment with his microscope.

He watched tiny growing microbes under many different conditions. Year after year he came closer and closer to the truth about diseases.

He learned that substances changed, "became sick," because microbes got into them. For example, he proved that beer and wine "spoiled," or "fermented," because microbes from the air got into them and multiplied by the billions. Later, after a long search, he proved that sick silkworms died because microbes got into the eggs and bodies of the grown silkworm moths and killed them.

"Find a way to keep the microbes out," he said, "keep the things 'clean,' and your liquor will not spoil, your silkworms will not become sick."

Then came another great step. Pasteur, in France (and about the same time Robert Koch, in Germany), proved that the dreaded disease called anthrax, which was killing thousands of sheep and cattle overnight, was caused by a particular microbe. In a day's time a healthy animal would die because one tiny microbe got into its blood and multiplied by the billions. Here was the answer to the question, What makes the animal sick? Thus, in 1876 (only 60-odd years ago) Koch proved this fact in his little German laboratory, and Pasteur in his French one. A little later it was Koch who discovered how to raise the germ itself in clear, boiled soup. Why should anyone want to raise the germ? We shall learn why in a moment.

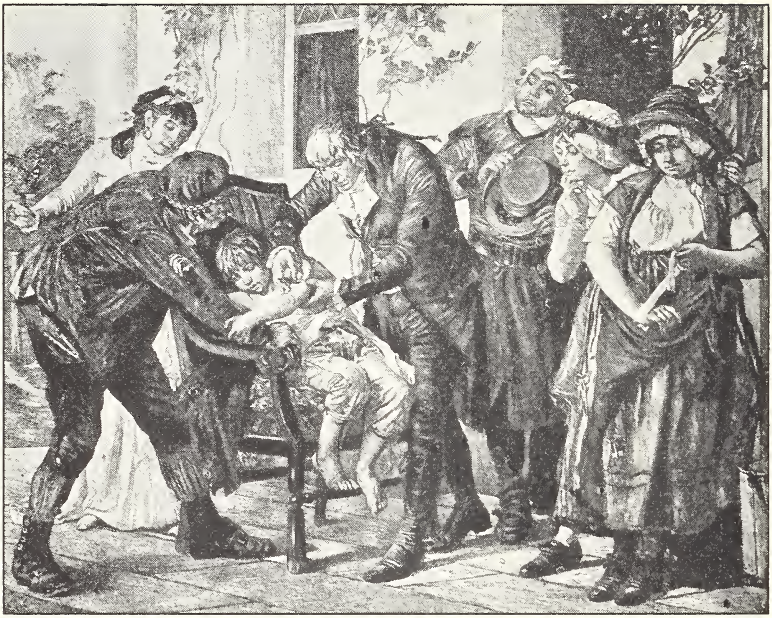
In order to help us to understand another very important discovery that Pasteur made, let us turn to another, earlier microbe-hunter.

The First Smallpox Vaccination: Edward Jenner, 1796

From time to time for 1000 years a terrible Asiatic disease called smallpox had swept over Europe. It was very contagious, that is, it spread rapidly from one human being to another. It was deadly and was greatly feared. But until 1796 no sure cure for it had been discovered.

In that year an English country doctor, Edward Jenner, solved the problem by clear observing and clear thinking. He found out that some of his own patients — young women who milked cows every day — frequently caught a mild disease called cowpox. This they appeared to get when their hands were chapped.

In the midst of an epidemic of smallpox in the neighborhood, one of these young women told Dr. Jenner that she "could not take smallpox because she had had cowpox." By asking ques-



Ewing Galloway

Fig. 146. The first vaccination. By it Edward Jenner proved that cowpox and smallpox are the same disease

tions the doctor discovered that the farm people were convinced that once having had cowpox they could not get smallpox. He decided after long study to try an experiment and see for himself.

In 1796 he made the first cowpox vaccination on an eight-year-old boy. Six weeks later he put some smallpox microbes into the boy. The boy did not fall sick! Jenner tried it on others. It worked! A great discovery had been made! A person who had had cowpox would not "catch" smallpox. He was "immune" to it.

Without doubt you too have been vaccinated for smallpox. We know that; for the laws of most of our states require that every child old enough to go to school must be vaccinated.

And now you know why such a thing was done to you and to most schoolboys and schoolgirls in all modern countries — to prevent you from catching smallpox! Certain microbes that came from a cow with cowpox were put under the skin on your arm or your leg by a doctor, who cut a little spot there. After being vaccinated you perhaps felt a bit ill for a day or two; a scar formed on your skin; and then you got entirely well and forgot all about it.

Now let us visit Louis Pasteur again — 84 years after Edward Jenner discovered how to prevent smallpox by vaccination.

Science Learns from Another Accident

In 1880 Pasteur was studying how the microbe that caused chicken cholera worked. By careful experimenting he learned how to raise these microbes in a clear soup made by boiling chicken meat. He found that if the microbes were put into chickens they would die of cholera in a day's time. Pasteur went off on a short vacation. On his return he found that some of this microbe soup (called by scientists a "culture") had been left standing. He injected some of this old cholera culture into healthy chickens, thinking that they would die. They got sick, as was usual, but, to his astonishment, they were perfectly well the next day! Again he tried the old culture, again the same result: slight sickness and then recovery.

He made some new cholera soup and gave it to the chickens. Would the new soup make them ill? They remained perfectly well! Again and again he repeated the experiment; he had to be sure. Each time the chickens remained well! They were immune to the cholera because they had been vaccinated with the old culture.

At last Pasteur had discovered how to prevent disease. "First *make an animal a little sick with germs that have been*

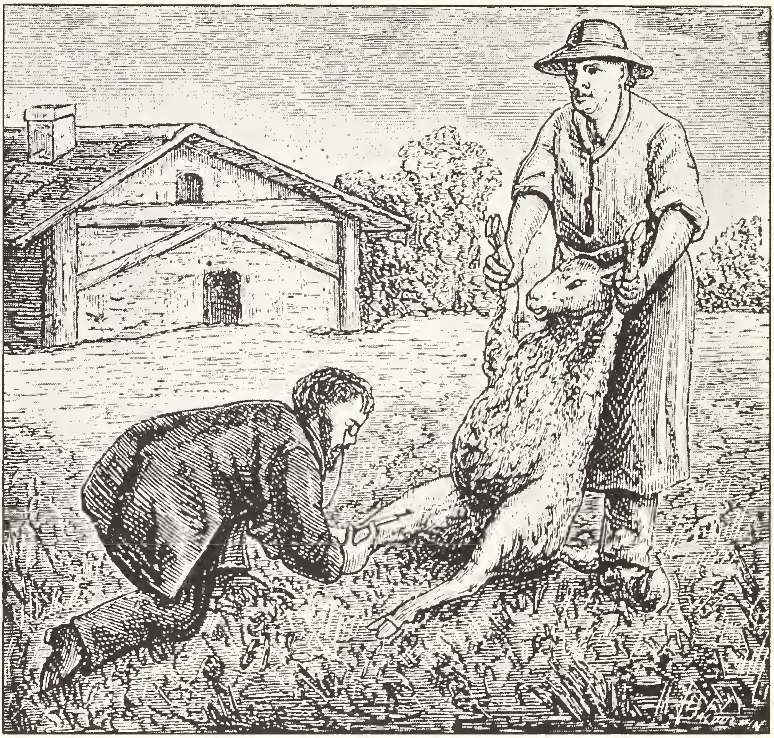


Fig. 147. Pasteur vaccinating a sheep for anthrax[1]

weakened. After that it will be immune to that germ." Jenner's experiment on cowpox over again!

The next year (1881) Pasteur tried experiments with the anthrax germ, which was causing the death of so many cows and sheep. The substance he prepared, called a vaccine (from the Latin word *vacca*, meaning "cow"), was made with weakened anthrax germs. There was a public test with 48 healthy sheep, 2 goats, and several cattle. He injected the vaccine into only

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[1] From Dr. de Kruif's *Microbe Hunters*. Published by Harcourt, Brace and Company, Inc.

half the animals. Then new anthrax germs were injected into *all* the animals. Pasteur and the public watched the animals and waited. In two days' time those that had not been vaccinated died. One by one they went. But not one of the vaccinated ones died. Success! Science had again won.

For long years doctors and other people had doubted that microbes caused disease or that microbes in the body could prevent disease. But now they were convinced. Clear observing, clear thinking, and exact experiment had made another great advance in man's fight for a better and happier life.

Pasteur Cures the First Human Being

But still Pasteur was not satisfied. So far his discoveries had not been applied to human beings; just to plants and animals. And he was sure that disease among human beings could be stamped out in exactly the same way. *Prepare a mild vaccine from the microbes of any disease.* Vaccinate people with it and make them a little bit sick. After that they will be immune to the real disease. That's the rule for animals; why can it not work for human beings?

In 1881 Pasteur had turned to the study of hydrophobia, or rabies, that dreadful disease of a mad dog. And he found the microbe that caused the disease too. But in working with the rabies cultures which he made he met one disappointment after another. Finally he found the needed weak rabies soup. With it he proved that a healthy dog which had been vaccinated with this weak soup got well every time it was bitten by a mad dog.

But even by 1885 the experiment had never been tried on any human being.

Then, on July 6, 1885, came Pasteur's great test. A nine-year-old boy bitten in fourteen places by a mad dog was brought to him. Should he try the weakened hydrophobia microbes?

Physicians and parents pleaded with him to do it. Finally he began. Every day for fourteen days he injected the rabies germs. And the boy never came down with the rabies.

At last a human life had been saved by a scientific experiment with microbes!

Because of his many great discoveries Pasteur became famous the world over. The French government and other governments honored him. Societies of great scientists made him an honorary member. His praises were sung on every hand. Today you no doubt speak his name every little while, for the milk you drink has been pasteurized.

But Pasteur was not successful in all his experiments. He had many disappointments. He drew wrong conclusions time after time. Slowly, however, he piled up new facts about microbes. He proved, for example, that there are many, many different kinds. He proved that most microbes are not the least bit harmful to plants or to animals. Indeed, he proved that many of them are useful, even necessary, to the life of living things. It would be difficult to name all the facts he discovered through his thousands of experiments and observations with his microscope.

What do you think? Does Pasteur deserve a place in the Hall of Fame?

Other Great Disease-Fighters Went On with the Battle

Pasteur died in 1895, but the wonderful work he started has continued. More and more great disease-fighters have carried on his scientific battle for the improvement of man's health. All the diseases which have long afflicted human beings have been studied. You probably know the names of the worst ones — typhoid fever, diphtheria, tuberculosis, cancer, malaria, pneumonia, yellow fever.

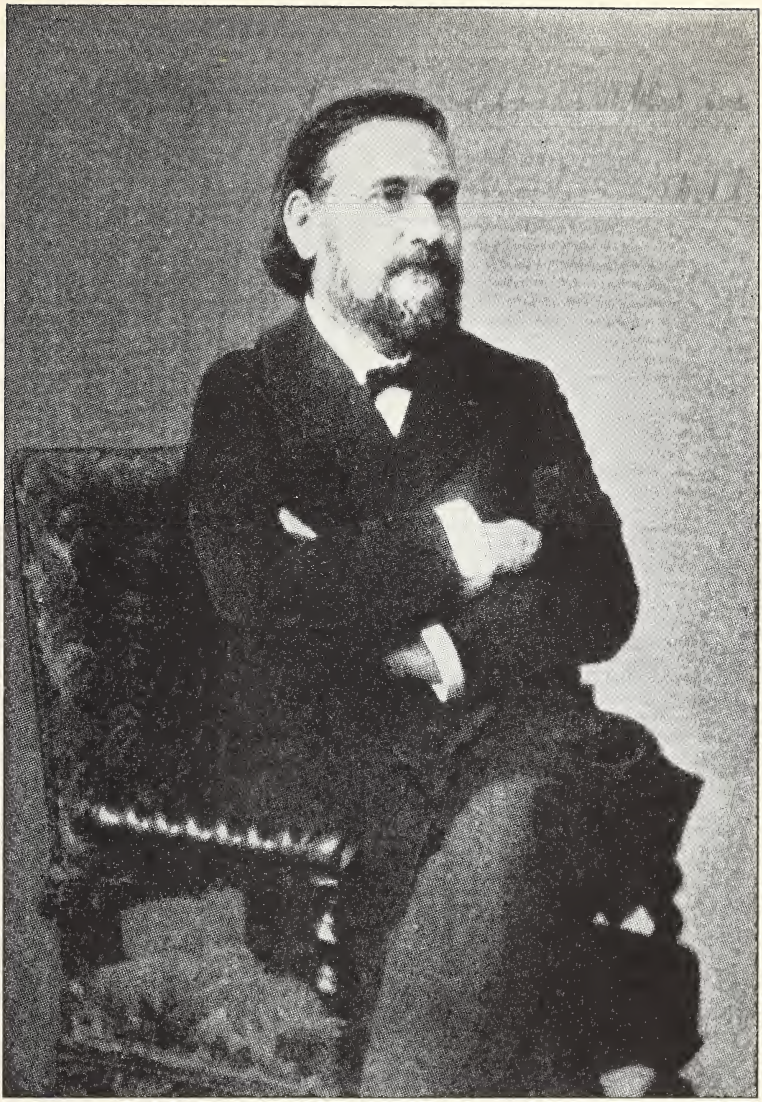

FIG. 148. Another microbe-hunter, the Russian Élie Metchnikoff[1]

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[1] From Dr. de Kruif's *Microbe Hunters*. Published by Harcourt, Brace and Company, Inc.

In each case the scientists searched and searched for the destructive microbe that caused the disease. In some cases they succeeded in finding it; in other cases they have failed to find it, even to this day. They were successful in diphtheria and typhoid fever, malaria and yellow fever. In tuberculosis they have had some success, but have never been absolutely sure that they had the right microbe. They have learned that there are several types of pneumonia, and they know definitely about the microbes which cause some of them. The same is true about certain other diseases, of which there are several types. In studying malaria and yellow fever they found that when certain kinds of mosquitoes bit a person they put the dreaded microbes into his blood.

The microbe-hunters have become victorious disease-fighters. Not only have they found the exact microbes that cause the diseases; they have also found ways to cure people suffering from them. They did this by preparing new vaccines. Vaccines for diphtheria and for typhoid fever. Vaccines for malaria and for yellow fever. Vaccines for certain types of pneumonia. Even the "common cold," which almost everybody gets from time to time, can be prevented in some people by vaccines.

Do you see, then, what a wonderful battle these microbe-hunters and disease-fighters have been waging? What heroic warriors they have been! Often they risked their own lives in experiments by having the dangerous microbes shot into their own bodies. Indeed, several of them died as a result. Great heroes they were — suffering and dying in the effort to solve unanswered questions about diseases, so that millions of their fellow men might live.

Two picture-stories of these disease-fighters are given in figures 146 and 147. Figures 146–149 show that all nations have their microbe-hunters.

Astonishing Results of the Battle of Science against Disease

As a result of this great war on microbes people are much healthier today than they were in earlier times. Several diseases have been almost completely stamped out of all the modern countries. For example, very few people in America, England, France, Germany, Scandinavia, and other industrial regions ever get smallpox or diphtheria or typhoid fever today. If you will look up the facts about such diseases, you will be surprised to see how the number of deaths due to them has decreased since 1870.

Take smallpox as an example. In the city of New York as late as 1875 several thousand people died of it each year. Now listen to this! Since 1923 there has not been a single death from smallpox in this city, and chiefly because vaccination has guarded people against it.

Ewing Galloway

Fig. 149. Colonel Walter Reed, the American army surgeon who proved that the terrible yellow fever is caused by the bite of a certain kind of mosquito. Because of his experiments there is practically no yellow fever in the world today

Take typhoid fever. In the Spanish-American War (1898) one third of the American soldiers got typhoid fever. About that time a successful vaccine was prepared and widely used. Water systems and milk and food supplies were carefully protected. About 1,900,000 American soldiers went to France in

1917 and 1918 during the World War; of this large number only 885 got typhoid! *All honor to the inventors of vaccine!* Nowadays only one person in 200,000 dies each year from typhoid fever.

The story is much the same for other terrible diseases. At last science is well on its way toward wiping out the great diseases of mankind and of its plants and its animals.

"Plants and animals, as well as people?" you ask. Yes; during the past half a century disease-fighters have been finding the microbes that kill them too. Let us name a single example. Some years ago a little animal called a tick was biting cattle and giving them "Texas fever." They died by the thousands. Scientists studied the problem and learned that when the cows were kept free from the ticks they remained healthy. Then began the war on ticks, a war which resulted in preventing Texas fever. Such examples can be multiplied many times.

MAN HAS NEVER BEEN FREE FROM PAIN!

Soon we must bring our story of better thinking and the gains of civilization to a close. But before we do so, let us refer to another exciting chapter, a chapter that tells the tale of how men learned to reduce pain.

For thousands and thousands of years man has suffered from pain. He fell and cut his body, he sprained or broke an arm or a leg, he bumped his head — and how he ached! His teeth wore out or the nerves in them became exposed — and how his jaws hurt him! Operating rooms were places of torture. Every slash of a doctor's knife made the patient scream with agony.

You know yourself how much it hurts to have a tooth ground or pulled or a cavity filled. Can you imagine what the pain must have been during more serious operations before the days of ether or novocain or gas? Today a body can be cut open and sewed up without the patient's feeling a thing. Ninety years ago that was still impossible; for ether or gas or other "anesthetics"[1] were not being used.

But scientists worked on the problem of reducing pain also, and they solved it! Here is a brief outline of how that happened.

The Death of Pain

In 1799 Sir Humphry Davy of England suggested that it might be possible to use a gas called nitrous oxide to dull the feeling of pain; but for 43 years his idea was not acted upon. In 1800 William Allen of London told an audience that inhaling "laughing gas" not only made one have a most delightful feeling but reduced the feeling of pain as well.

Soon after that, in the United States traveling entertainers called "lecturers" began to give demonstrations of the funny antics that laughing gas caused in people. In 1841 one such entertainer visited Jefferson, Georgia, where a tall, handsome young doctor — Crawford W. Long — lived. Dr. Long's friends who had seen the visitor's performance reported the events of the evening to him. They asked him for some laughing gas, but he had none. He remembered, however, someone's having used ether for the same effects. They tried ether, and it worked! What fun they had singing, dancing, making speeches! Some even had long, imaginary arguments. After that they gathered in Dr. Long's office two or three evenings a week for "ether parties."

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[1] Dr. Oliver Wendell Holmes, the well-known writer and physician, coined the name "anesthesia." It comes from *an*, meaning, in this case, "not," and the Greek word *aisthesis*, which means "feeling."

But all the while Dr. Long was using his eyes and his mind. He noticed that when his friends under ether fell or were hit they didn't seem to mind. Black-and-blue marks appeared on their bodies, but they did not remember receiving them. Finally the idea struck him that ether might be used to kill pain.

A little later (March 30, 1842) Dr. Long told a friend, James Venables, who was bothered by two little tumors on the back of his neck, that they would have to be removed. He suggested that Venables inhale ether while the operation was being performed, so that it wouldn't hurt so much. Venables agreed to do it. When Dr. Long knew that Venables could feel nothing, he reached for his knife. The whole thing was over in five minutes. When Venables "came to," he insisted on seeing the tumors; he doubted that they were really out.

The news of the operation spread. And dreadful rumors spread too. Jealous doctors in the neighborhood began to say that Long would kill a patient sooner or later if he continued. He received warnings that if one of his patients should die under ether he might be lynched! People of the town became terrified. Some thought that Dr. Long would put people to sleep and carve them without their knowing it. Children ran to their homes when he walked down the street. Sick people went to other doctors.

But Dr. Long went on using ether to deaden the pain of his patients during operations.

Meanwhile dentists and physicians in other parts of the world had been trying unsuccessfully to find a safe way to deaden their patients' nerves during operations. Dr. William T. G. Morton, a dentist in Boston, was one of these. He had tried getting his patients drunk on brandy and on champagne, but these had failed to deaden the pain. He had even tried opium without success.

One day in 1843 he heard that medical students were having great fun inhaling ether. He rushed to his library to read about ether, but the books said that it was dangerous to use. Nevertheless he grew bold and poured a few drops in his handkerchief and lifted it to his nose. The result was a splitting headache. A little later he tried the ether on goldfish, bugs, insects, worms, and other animals. But people made so much fun of him and his experiments that he discontinued them. He had also heard of the laughing-gas experiments; but when he tried using the gas to deaden pain in 1845, he failed. For a whole year after that he did no more experiments.

In the spring of 1846 Morton's interest was aroused again. He made a dog inhale ether, and the animal immediately relaxed in his arms. For three minutes he pinched the dog, he shook him, he poked him; but the dog didn't move. After lying quiet a while the animal suddenly jumped up yelping. "This *is* something!" thought Morton. "This dog absolutely did not feel a bit of pain."

Then Dr. Morton tried ether on some of his pupils. One not only failed to go to sleep but offered to fight anyone in the crowd. Another tried it, and he too became violent. Morton thought that perhaps a towel or a handkerchief wasn't the best thing to use. Later, at the suggestion of a chemist, he tried a flask and another form of ether on himself. He shut himself up in a room and inhaled the ether. He went into a deep sleep. When his mind began to clear, he noticed that if he pinched himself it didn't hurt! He tried to rise, but fell back. When full control of his senses came back, his watch said that he had been unconscious for over seven minutes!

Dr. Morton rushed out of his office, screaming "I've found it! I've found it!" He danced round the room. He laughed. He slapped his friends on the back. At last he was sure. All he needed was a patient to prove it.

That evening a patient, Eben Frost, suffering with an extremely painful jaw, asked Dr. Morton if he could take the pain away while a troublesome tooth was being pulled. Morton tried the ether. At first Frost struggled; then he lay still. Out came the tooth. Soon Frost began to groan and talk. And then how grateful he was! He had felt absolutely nothing!

Morton tried the ether with other patients after that. Sometimes it worked, and sometimes it did not. In one case a boy was made very ill from the ether. The lad's parents rushed out of the office in anger and went to another doctor, who said that the boy had been poisoned. The boy's father returned and threatened to sue Dr. Morton for trying to murder his child!

Finally a big test came. Morton persuaded Dr. John Collins Warren of the Massachusetts General Hospital in Boston to let him use the ether. The time came, and the gallery of the operating room was filled with doctors and medical students who had come to watch the removal of a tumor from the neck of a young man. Morton gave the ether, and the patient went sound asleep. Dr. Warren performed the operation and sewed up the wound. When the patient woke up, he said, "It didn't hurt at all, although my neck did feel for a minute as if someone were scraping it with a hoe."

Turning to the surprised audience, Dr. Warren announced: "Gentlemen, this is no humbug!"

Many other successful experiments were made at the hospital, but still people doubted. Dr. Morton was talked about in much the same way that Dr. Long had been. Doctors criticized him. Sermons were preached against him. Criticism stormed in from every side. Only the Massachusetts General Hospital seemed to have confidence in him. It continued to use ether during operations.

However, as time passed and as more and more successful operations using ether were made all over the country, criticisms died down. People began to be grateful for the discovery of this great painkiller.

But even to this day people disagree about who should be given the credit for the discovery of anesthesia. It cannot be denied that Dr. Crawford W. Long had made the first successful experiments with it. And it is equally impossible to deny that it was Dr. Morton who had introduced it to the world. Perhaps credit should be given to both.

These examples, brief as they are, tell us something of the great advances in the prevention and cure of disease and in the deadening of pain. And this heroic work was possible because men developed better ways of thinking, more scientific ways of study.

Now before we leave our study let us remind ourselves of some of the other great achievements of scientific thinking.

SCIENCE AND INDUSTRIAL LIFE

Because there were so many examples in *Man at Work: His Industries* of the things science has done for mankind, we shall not study any new ones here. Let us turn back to that book and refresh our memories.

For example, man's use of power and power aids. We learned there that whenever inquiring scientists noticed something happening that they did not understand — such as the lightning which flashed across a stormy sky — they did not say, as the ancients had said, "Oh, the gods are angry"; they asked, instead: "Why did that happen? What caused that?" Our own scientist Benjamin Franklin learned the correct answer, "Lightning is electricity." But Franklin did more than think that answer up. *He made an experiment to find out if his think-*

ing was correct. As you know, he flew a kite in a thunderstorm and got an electric shock at the end of the string he was holding.

By experimenting, other scientists discovered that there is power in electricity — power which can turn wheels and do work, run trains and cars, operate machinery, send messages, and do many other things.

Scientists also discovered that there is power in steam. They learned that this power can move things also — turn wheels. Finally they invented steam-driven locomotives and motorcars and many other self-moving vehicles.

In our earlier studies we also found out that scientists thought up other new ideas and carried out other experiments. They learned that electricity could be generated by water wheels and windmills, by steam engines and gas engines. These made it possible for man to build great central power stations and to send electricity over wires to light and heat our houses and to run the giant machines of our factories.

They also discovered how to combine such things as iron and carbon, tin and manganese, to make strong "alloys" like steel. Thus new materials were used to make our streamline trains and bridges, our factory engines and machines, our farm tractors, reapers, and threshers, our motorcars and airplanes.

But all these and many other examples about how science changed man's ways of work, you know already. We need not add more here.

Now We Can Sum Up the Change from Magic to Science

From these exciting stories one fact is clear: Throughout the ages people have learned to think better and better. "Throughout the ages," we say; for it has been going on from the very earliest times. However, there probably was a time when our earliest ancestors could hardly "think" at all, but this was perhaps more than a million years ago.

Then slowly, oh, so slowly, man — alone among the animals — developed his "brain" and his system of "nerves." Our story has given many examples to prove that he did think more and more clearly as long stretches of time passed. There were more and more results of his better thinking. Crude Stone Age ways of living changed into the first real civilizations. Then inventions came faster. Finally, in modern times — the last few hundred years — inventions came with lightning speed. At least so it seems now, as we sum up the astonishing story. Look at it!

> Man invented better tools, better implements, better weapons.
> He invented better houses and clothing.
> He invented agriculture, and then better and better ways of raising food.
> He invented "industry" — machines and engines to run factories which manufacture the things he uses.
> He invented modern transportation — ways of using engines and machines to transport things swiftly.
> He invented modern communication — ways of sending messages by telegraph, by telephone, by wireless, by radio. He invented a modern postal system.
> He invented ways of improving his health by finding the causes and cures of diseases.

He invented — oh, so many other things! Perhaps we have named enough to remind ourselves of the great gains of civilization. And all these have developed because of better ways of thinking. In every case man has used *science* and the *scientific ways of thinking.*

What, Then, Is Scientific Thinking?

Our brief study of the way man is learning to rely on science instead of on magic can be well summed up by answering that question. Here are four steps that are included in scientific thinking. Can you find others?

First. Scientific thinking requires clear and exact observing. Definite answers must be given to definite questions; for example: How many are there? How much? Exactly what took place? Exactly when did it take place?

Clear and exact observing requires as accurate counting and measuring as possible: Exactly how large or how small? How long or how heavy? How strong or how weak? How high or how low? Clear observing, clear seeing, then, is the first requirement.

Second. Scientific thinking is clear thinking. Above all else it searches for the relations between things. It asks: "What are the chief factors in the problem? How are they *related*? If we change this factor, how will other *related* factors change?" Thus, the most important thing of all is *finding relationships.*

Third. Wherever it is possible, scientific thinking requires experiments to find the unknown things that are *related.* If we do so and so, what changes will be brought about? What effects will these have? Matters are definitely arranged in advance so that the unknown *relationships* can be discovered.

Fourth. Scientific thinking requires imagination and "open-mindedness." It welcomes and tests every possible answer. It tries *not* to ask, "What do I *want* to believe?" It turns its back on all magic, all charms, all superstition. It asks, "What is the truth, as near as I can discover it?"

These, then, are four necessary steps of scientific thinking. And man is learning to use these steps more and more. As a result he is steadily building better and better civilizations.

Books You Would Like To Read

Collins, A. F. Book of the Microscope. D. Appleton-Century Company, Inc., New York.

Conn, H. W. Bacteria, Yeasts, and Molds in the Home (third edition). Ginn and Company, Boston.

Cottler, Joseph, and Jaffe, Haym. Heroes of Civilization. Little, Brown & Company, Boston.

de Kruif, Paul. Microbe Hunters. Harcourt, Brace and Company, Inc., New York.

Disraeli, Robert. Seeing the Unseen. John Day Company, Inc., New York.

Gilbert, Ariadne. More Than Conquerors. D. Appleton-Century Company, Inc., New York.

Haviland, M. S. Modern Physiology: Hygiene and Health (3 vols.). J. B. Lippincott Company, Philadelphia. The first volume is the *Primer: The Most Wonderful House in the World*, which discusses personal hygiene and rules of health. Book I is *Play-House and Hygiene*, which tells of the underlying principles of sanitation. Book II, *Good Neighbors*, discusses community hygiene.

Holway, H. K. The Story of Health. Harper & Brothers, New York.

Jewett, F. G. Town and City (Gulick Hygiene Series). Ginn and Company, Boston.

Kopeloff, Nicholas. Man versus Microbes. Alfred A. Knopf, Inc., New York.

Park, W. H., and Williams, A. W. Who's Who among the Microbes. D. Appleton-Century Company, Inc., New York.

Parkman, M. R. Heroines of Service. D. Appleton-Century Company, Inc., New York.

Watson, Barker W. The World beneath the Microscope. Studio Publications, London.

Williams-Ellis, Amabel. Men Who Found Out: Stories of Great Scientific Discoverers. Coward-McCann, Inc., New York.

Yates, Raymond Francis. Exploring with the Microscope. D. Appleton-Century Company, Inc., New York.

CHAPTER XXVIII

Man: Child of the Earth and Child of the Past

I. MAN AS THE CHILD OF THE EARTH

MANY CHARACTERS have passed before our eyes as we followed the story of mankind. There were primitive men with bent legs and receding brows. There were hunting and herding farming folk of a later time. There were kings and farmers from Egypt and Babylonia. There were the art-loving people of Crete. There were the wise men of Athens and the masterful men of Rome. There were the civilized Chinese and the gifted Central and South Americans. There were the European barbarians, the serfs in their huts, and the lords in their castles. There were the eager thinkers of the Middle Ages. And there were the weary machine-workers of the new industrial age. All these we have watched come and go, one following on the heels of the other.

But have you thought, as you have read, that there is one character which remains all through the story? Have you noticed that the earth itself, with its oceans and continents, its rivers and seas, its heat and its cold, has never been long out of the story?

The earth itself has played a most important part in the story of man. In fact, man lives just about the way the earth will let him live. The mountains and deserts and rivers and seas, the heat and the cold, the winds and the rains, decide what his story will be like. Man is indeed a child of the earth.

And so, as we reach the end of our rapid sketch of mankind throughout the ages, let us stop and notice this ancient and important earth.

As you think back over the story is there any one way more than another in which the earth has influenced man? Has the shape of the land played the most important part? Have the rivers or the oceans? Have the mountains or the deserts? Has the temperature or the rainfall? Perhaps you have an idea; we honestly do not know. So we may as well start with one thing as another.

1. How Is Man Affected by the Size, the Shape, and the Location of the Continents on Which He Lives?

As you look at the world relief maps (maps 18 and 25, pages 451 and 500–501) notice the six continents. Does it strike you that they are very different from one another? In what ways are they different?

Do these differences seem unimportant to you, or are you convinced that they have affected man's life and history? Do you see why Australia has played so small a part in history? Do you see why American history was so cut off from European, African, and Asiatic history until about 1500 A.D.? Do you see why Chinese and Indian history were not quite so much cut off from European history, but still had only a few connecting links until modern times? Do you see some reasons why the far interiors of Africa and Asia have not produced great civilizations? Do you see why Europe has become the leader of modern civilization?

These continents and islands mean a great deal to us, then. The question of their size, their location, their coast line, is important to us when we think of the past or the future of mankind. On them man works out his story.

2. How Is Man Affected by the Topography of the Region in Which He Lives?

The land has other features which also play a great part in deciding what kind of life we shall lead. Do the men of the mountains live the same kind of life that the men of the fertile river valleys lead? Do the men of the plains live in the same ways as the men of the forests? Do the men of the desert live the same kind of life that any of the others live? No, we know that all these surface conditions of the earth — that is, its topography — make men live different kinds of life.

The River Valleys

Think of the fertile river valleys we have read about. What kind of life arose in these regions? We know now that a settled agricultural life developed there earlier than elsewhere. As time went on the population there became dense. Finally these people built up what we call civilization. In the river valleys we find many of the beginnings of mankind's biggest achievements. What illustrations can you give?

The Plains

There is another type of land which we think of as agricultural — the plains, such as the plains of our own Middle West, those of southern Russia, and many others. Today the plains are among the richest farming lands of the earth. But agriculture did not rise in such places as early as it did in the valleys of the Nile, Euphrates, and Yellow rivers. At one time many of the broad plains were inhabited by peoples who kept flocks and herds and who moved from one place to another as the pasture lands gave out. Even today, when the plains are agricultural regions, they are not centers of dense population.

The exceptions are those places in which rivers or harbors or natural resources have led to trade and industrial development. Nevertheless, like the river valleys, they are settled and highly civilized lands.

The Mountains

If the lives of the people of the fertile river valleys and of the broad plains are somewhat different from each other, that of the mountain people is still more different from both. There the population is thin and scattered. Farming is possible only on some of the lower slopes. Above the line of farm lands can be kept flocks and herds. But a land devoted to flocks and herds is always a land of scattered population. Far more land is needed for animals than for crops; for the animals eat the plants rapidly and must be continually moved to new pastures.

The people of the mountain lands are more independent than those of the plains and river valleys. Perhaps the reason is that they have not had to rub up against other people as much as the inhabitants of more thickly settled lands must do. Nor have the people of the mountains usually developed civilizations to equal those of the river valleys and plains. It seems that it is in crowded places that civilizations develop.

The Deserts

And what of the people of the deserts?

There are two kinds of deserts. First, there are the cold northern deserts like Alaska, northern Canada, and northern Siberia. There the weather is too cold to permit agriculture. The people are hunters whose food is largely the flesh of arctic animals. Their dress is made from animal skins. Not everyone can live in lands like these, and, as we should expect, the population is much thinner than in lands where life is easier. They have always been interesting people, these Far Northerners; but their climate has not encouraged the development of civilizations like those of more temperate climates. So they have not played much part in world history.

The southern deserts are quite different. They are the hot, sandy deserts, like the Sahara and the Arabian Desert. They do not seem very favorable to life, but people do live there. Of course water and some vegetation are found at certain places. Oases, where springs water small areas in which trees and plants grow, are scattered through them. And along the desert edges there are grasslands where flocks and herds may graze.

The desert dwellers live more unsettled lives than do the people of the mountains. We say they are nomads. In order to feed their flocks and herds, these people must be constantly on the move. For this reason they seldom build houses. Instead they live in tents, which can be packed up and carried off to a new pasture.

Living this wandering life, the desert dwellers have never developed a very high civilization of their own. Nevertheless, they have played a big role in history. The great deserts have on their borders fertile agricultural lands. All through history the attacks and invasions by desert people on the settled agricultural lands have continued. Egypt was raided by desert tribes. Mesopotamia and Palestine were constantly being attacked, invaded, and even settled by desert peoples. The Jews themselves were such a group of desert folk. And the Mongols of central Asia burst into Europe and China over and over again.

As a result of their life the desert dwellers have always been a bold and warlike people; but when they settled down in agricultural lands, they became like the people who were around them.

The Forests

Finally, there are the people of the forest lands. There are two kinds of forests, just as there are two kinds of deserts. There are the forests of the temperate and northern regions, for example — the forests of Europe and eastern North America. Many of these are now cleared, and in their places are farms and cities. But before they were cleared the people lived there by hunting and fishing, as do the people of the forests which still stand. We saw the Europeans of the Stone Age living this kind of life, and we know that the Indians of North America lived in the same way. Both did some farming, and both continued to make use of the food that the forest provided.

The other kind of forest land is the tropical forest. There life is much easier than in the north. Trees and wild plants provide the food that is needed in a warm climate. The problem of housing and clothing is simple, for not much protection is needed.

The population of forest regions is not dense, particularly in the northern forests, where life is difficult and where large woodland areas are necessary for hunting. And so long as the people have remained forest dwellers they have not added much to the history of civilization. Many of the peoples of the northern forests, however, have (as in Europe and America) taken over the more civilized ways of other regions. They have settled down and built, or started to build, civilizations of their own.

And so, you see, the peoples in different kinds of regions on the earth's surface live differently and therefore are different kinds of people. Mother earth is a tyrant, and she makes of her children what she will.

3. How Is Man Affected by Bodies of Water?

Man is really a land animal, and we have seen how the land he lives on determines what kind of man he will be. But there is another feature of the earth's surface which is also very important. That is water.

The continents, you see, are really just land masses sticking out of one vast ocean of water. However, they divide up the water in such a way that we say there are five oceans: the Atlantic, the Pacific, the Indian, the Arctic, and the Antarctic. Then there are many smaller bodies of salt water called seas: the Mediterranean, the Baltic, the Red, the Black, and so on. There are innumerable lakes, large and small. Our five Great Lakes — Superior, Michigan, Huron, Erie, Ontario — are the most important of these. Then there is the running water — rivers and streams — which we find everywhere except in very dry regions.

And what a place all this water has had in man's history! Sometimes it cuts a land off from the rest of the world; sometimes it unites a land with the rest of the world. Salt water is good neither for drinking nor for watering fields, but fresh water is used for both all over the world. Sometimes water is a disadvantage; more often it is one of man's greatest helps. Sometimes he has even made artificial waterways, or canals. Water has come into our story many times.

4. How Do Sun, Wind, and Rain Affect Mankind?

Knowing the difference between hot and cold climates, we have learned that there are differences between the people of hot and cold climates. The people of hot climates must live more quietly than the people of cold climates. We have also learned the effect of rainfall on ways of living. We know what a dry summer does to the farmer's crops. Perhaps we know less about the wind, but it is just as important as temperature and rainfall. These three — temperature, wind, and rainfall — are all tied up together and make what we call climate. And climate, we have found, has been one of the greatest earth factors in making the life of man what it is.

Life of warm lands is easygoing because of climate. People in cooler lands are more energetic because of climate. The animals and plants in warm and cold climates are not the same. In warm and cooler lands with heavy rainfall vegetation is plentiful. Where rainfall is light vegetation is scanty. Do you see now some of the differences that climate makes in the life of man? It is one of the important features of mother earth which we must consider in thinking of the history of mankind.

5. How Do Coal, Iron, and Other Natural Resources Affect Man's Life?

We have seen what coal and iron had to do with the coming of the Industrial Revolution in England. Coal, iron, and the other resources of the earth have come to play an increasingly important part during the Industrial Age. By the time you finish your social-science studies you will know how true this statement is. You will learn many interesting facts about the effect of the natural resources upon an industrial civilization.

Do You Think Now that We Are Right in Calling Man the Child of the Earth?

Is it true that man is what he is to a great extent because the earth has made him that way; that mother earth molds men's lives and history? Man can never entirely escape from her influence.

II. MAN AS THE CHILD OF THE PAST

We have seen that the kind of life which man leads is always changing. Throughout the ages old ways of doing things and old ideas have died, and new ones have taken their places. Usually there is a conflict between the old and the new. The old has many friends. But the changes come, nevertheless.

What makes these changes come about? If we knew the whole answer to that question, we should be much wiser than we are. But we do know that they are the result not of any one cause, but of many causes. The movements of people from one region to another play their part. Thus peoples are brought together so that they learn from each other. Changes in the geographical conditions under which people live, like the changes of the Ice Ages, play their part. Trade plays its part, teaching people that there are other ways to live than their own and carrying knowledge from place to place. Chance discoveries, followed by other discoveries and inventions, play their part. Curiosity leads men to make experiments and so learn new things. Study and hard work bring about helpful changes. These and many, many other causes work together to make our ever-changing history. And each change, of course, leads to still further change. And so the story goes on and on.

And yet in spite of all this the past is never dead. When we think it is over, we find that the present has always grown perfectly naturally out of the past. If the past had been different, the present would be different. Today always has its roots deep in all the yesterdays. Life in the United States would not be what it is today if life had been different in Europe at the time of the Industrial Revolution or during the Middle Ages, or if it had been different in Rome or Greece or Egypt or Mesopotamia or even in China. Our machines are improvements of the tools of ancient times. Our farming and cattle-raising have come down from early days. Although our writing and our language have constantly changed, they can be traced far back to Egypt and Mesopotamia and to the plains where our Indo-European ancestors kept their flocks and herds. Our art, our philosophy, our literature, our science, — all have sprung from seeds planted in many ancient lands.

No; we could not shake off the influence of the past, however hard we might try. And yet that is no reason why we should cling to the past. We need not worry about losing it. It will cling hard enough to us. The thing for us to think about is what changes we are to make, for change we will and must. It is with the present and the future that we must be concerned, not with the past. And it is with the present and the future that we will be chiefly concerned in our later studies.

Why, then, study the past at all? Because we cannot understand the present and the future without it. Since tomorrow will be the child of today, and today is the child of yesterday, we cannot be very wise in thinking about today and tomorrow if we know nothing about yesterday. Who can understand modern industrial life unless he knows something about the handicraft system which preceded it? Who can understand Rome without knowing something about Greece? Who can understand the problems of the United States without seeing how they came about? The past can show the mistakes that have been made and how they were corrected or how they might have been corrected. Many of the problems of the past are enough like those of the present to teach us something if we want to learn.

These are the reasons, then, that in the volumes of Man and His Changing Society we have interrupted our story of the present to tell you something of the past. And these are the reasons why as we go on we shall often tell you something of how the present came about. Don't you think it is worth while?

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KEY: You say *ă* as it is in *can*; *ā* as it is in *cane*; *ä* as it is in *father*; *â* as it is in *bare*
ĕ as it is in *bet*; *ē* as it is in *be*; *ē* as it is in *her*
ĭ as it is in *hid*; *ī* as it is in *hide*
ŏ as it is in *not*; *ō* as it is in *note*; *ô* as it is in *horse*
oi as it is in *oil*; *ou* as it is in *out*
o͝o as it is in *foot*; *o͞o* as it is in *food*
ū as it is in *use*; *ng* as it is in *sing*; *th* as it is in *that*

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PRINTED IN THE UNITED STATES OF AMERICA